Bruce N. Canfield's

U.S. Infantry Weapons of World War II

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BRUCE N. CANFIELD

ANDREW MOWBRAY PUBLISHERS • P.O. BOX 460 • LINCOLN, RI 02865

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Bruce N. Canfield
U.S. Infantry Weapons of World War II
Lincoln, R.I.: ANDREW MOWBRAY INCORPORATED — *PUBLISHERS*
304 pp.

ISBN: 0-917218-67-1

Improved Third Edition.

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Printed in the United States of America

This book was designed and set in type by Stuart C. Mowbray.
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About the cover: "The Battle of Crucifix Hill," a painting depicting
Capt. Bobby E. Brown (Medal of Honor Recipient) leading the men
of Company C, 18th Infantry Regiment. Courtesy of Stivers Publishing.

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Dedication

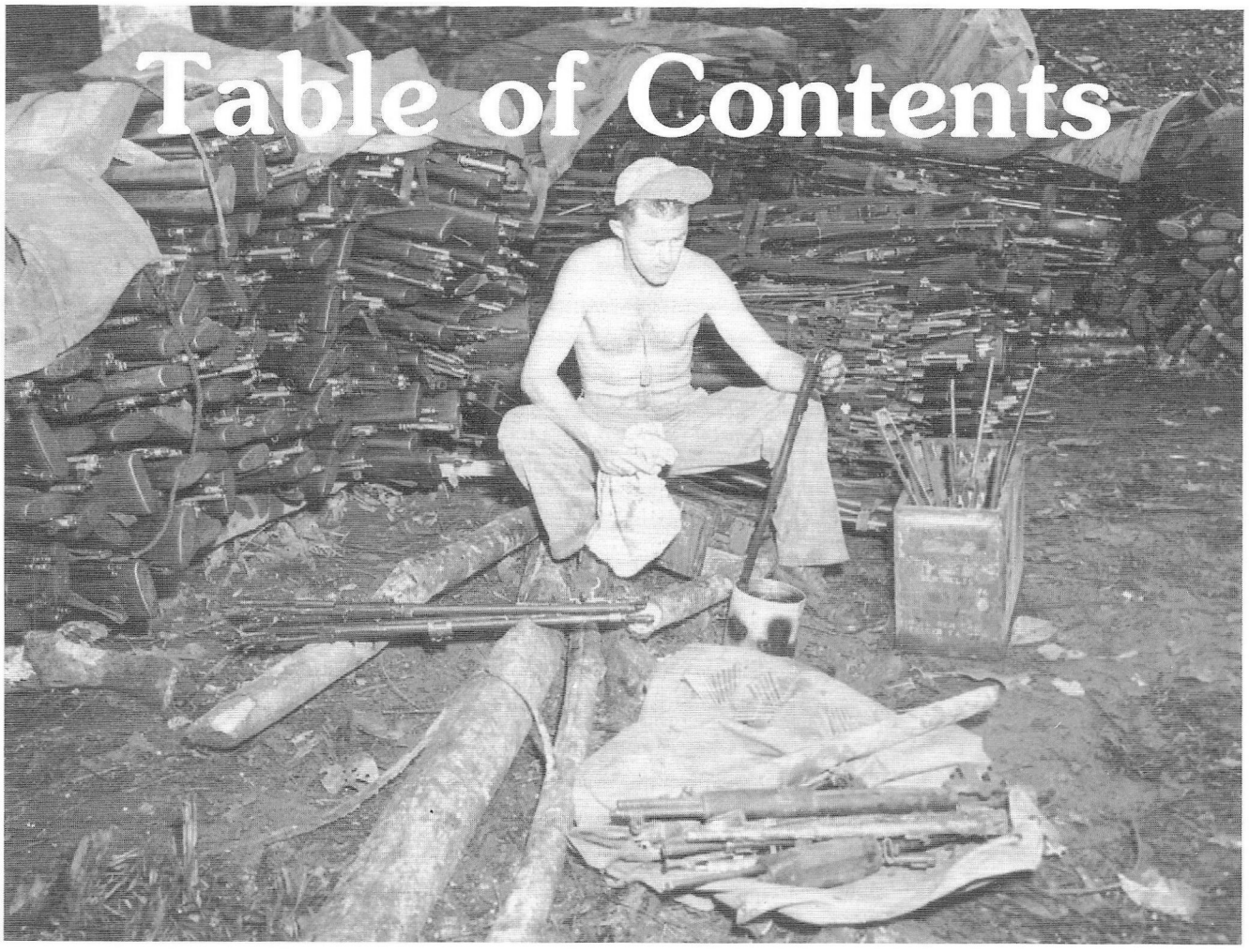
This book is gratefully dedicated to all of the brave Americans
who served in our armed forces during the Second World War.
Their noble deeds have secured the freedom all of us have enjoyed for the past half century.

Acknowledgments

A book of this nature requires the efforts of many people. The author would like to acknowledge and sincerely thank the following individuals who graciously contributed data, photographs and information for use in this book.

A great debt of gratitude goes to the noted arms historian and writer, Konrad Schreier, Jr. who took a special interest in this book and provided a great deal of valuable data, documentation and photographs from his extensive files. As a World War II combat veteran and graduate of the U.S. Army Ordnance School at Aberdeen Proving Grounds in Maryland, his comments and knowledge were very helpful in putting this book together and his assistance is sincerely appreciated. Other individuals who provided photographs and material include Hayes Otoupalik, Robert G. Segel, Robert J. Boucher, my photographer Scot Smith, Billy Pyle of the "Garand Stand", Scott Duff, Jim Enos, Kris Gayman Leinicke (Curator of Rock Island Arsenal), Peter Senich, R.G. "Rudy" Rosenquist (Curator/Director of the U.S. Marine Raider Museum), Robert Buerlein (President of the American Historical Foundation), Michael J. Winey and Louise Arnold-Friend of the U.S. Army Military History Institute and Frank Mallory of the Springfield Research Service.

I would also like to give a special thanks to my father, Charles K. Canfield, Sr., who is a decorated combat veteran of World War II. His personal knowledge of many of these weapons and their employment in the war was very helpful. A great deal of appreciation goes to my wife Betty and my son Andrew for their patience and understanding. Thanks also to Andy Mowbray, Stuart Mowbray and the fine staff of Andrew Mowbray Publishing for their usual great assistance in putting this book together.



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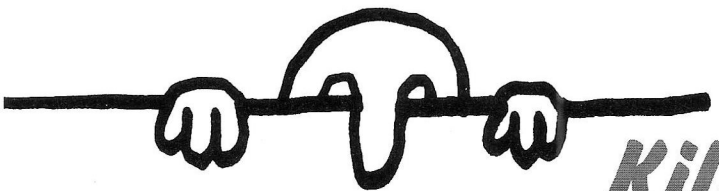


Kilroy Was Here!

Author's Preface

To many veterans who served in the conflict, it may be hard to believe that over a half-century has passed since the United States became embroiled in the Second World War. Two generations of Americans have grown up since the conclusion of the greatest armed conflict known to mankind. To many young people today, the names of Guadalcanal, Bastogne and Iwo Jima may seem almost as distant as Gettysburg, Shiloh or Antietam.

Many excellent histories of the Second World War have been written and are still being done to this day. However, there have been only a few books devoted solely to the infantry weapons of the war and fewer still cover the individual arms in some detail. The purpose of this book is to profile the weapons employed by the American infantry, both Army and Marine Corps, of the Second World War with some information on the collecting aspects of the arms.

As with any work of this sort, some parameters are necessary. The book covers more than the traditional small arms, but the term "infantry weapons" is very broad and could be expanded to cover virtually all tools of warfare, such as antitank guns, artillery, half-tracks, tanks and myriad other items. While attempting to decide what to include and what to leave out of this book, I discovered the ideal framework in a passage found in *The United States Army in World War II; The Technical Services, The Ordnance Department: Procurement and Supply,* which stated the following:

As with so many other terms in military language, "small arms" did not have a hard and fast meaning. General usage over the years defined it as including all weapons with bore diameter of .60 inch (.60 caliber) or less, whether pistols, revolvers, rifles, carbines, submachine guns, or machine guns. These standard hand or shoulder weapons of infantry troops were supplemented traditionally by mortars that stood somewhere between shoulder weapons and artillery. But in World War II the infantry soldier also fought with 2.36 inch rocket launchers and a few recoilless rifles which, in spite of their large calibers, were generally classed as small arms or, more meaningfully, as infantry weapons. By this usage, the determining characteristic was not diameter of bore but portability—whether the weapon could be carried into combat by infantry troops and could be fired from the hand, shoulder or light support.

The last sentence of the above paragraph perfectly reflects the criteria which was used to select the weapons included in this book.

While some basic collector information will be presented in the "Collector Notes" accompanying the discussion of each weapon, this book is not intended to be an in-depth collector's guide on each and every weapon. Some of the weapons profiled, such as the M1 rifle, M1 carbine, M1903 rifle, .45 pistol and many of the edged weapons, are the subjects of some detailed collector oriented books. Anyone wishing to explore the collecting aspects of these weapons in detail should obtain the appropriate book. Other weapons, such as machine guns, bazookas, mortars, flame throwers and the like, have had very little written about them, especially from the collector's viewpoint. Hopefully, this book will provide some useful and interesting information for the collector, or potential collector, of these weapons. As will be seen, the "Collector Notes" section contains much more information and detail on some of the weapons than for others. This is due to greater collector interest and the mar-

ket availability of these weapons and because some of the weapons underwent numerous changes throughout the war, while others were changed very little. For example, during World War II virtually every part of the M1 rifle and M1 carbine was modified for either greater efficiency or faster production time; while other weapons, such as the mortar, saw relatively few changes after its initial adoption.

The opinions, observations, comments and statements pertaining to the various weapons discussed in the pages that follow are taken from published sources, government documents and/or the personal recollections of World War II veterans. Many vets who read this book may very well have differing or opposing viewpoints regarding these weapons. This is perfectly understandable and is to be expected.

It should be mentioned that the private ownership of a number of the weapons discussed in this book is subject to stringent federal (and some state) laws. This is not to imply that these items are not collectible or available (although that is the case in some states) but rather to point out the legal regulations which must be complied with in order to lawfully possess such weapons. A section in the back of the book details the specific weapons that require federal approval for transfer and ownership and gives some information on how this may be accomplished. Any questions regarding the federal laws should be referred to a licensed dealer of such weapons or the Bureau of Alcohol, Tobacco and Firearms (ATF). Questions about any state regulations should be referred to the appropriate authorities.

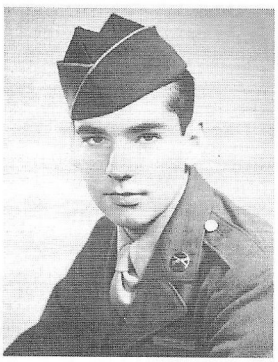
The weapons of World War II are among the most popular collecting themes around today and since the 50th anniversary of the war will continue through 1995, interest in these weapons will surely continue to grow. I cannot think of any era in United States military history which has more hardware still out there and available.

It is hoped that this book will appeal to the collector, arms buff, military historian, World War II vet and anyone else who has an interest in the U.S. infantry weapons of the Second World War. All of the weapons discussed herein played a role in securing our victory against the Axis powers. Many of these weapons may appear somewhat anachronistic while others still remain in use today by our armed forces. Their contributions to the cause of freedom during this most critical time in our nation's history has often been overlooked. It is time for this oversight to be corrected.

Bruce N. Canfield
P.O. Box 892
Shreveport, LA 71162
1994

(All weapons not otherwise credited are from the author's collection.)

Introduction



When I was a child, I was privileged to see a handful of Civil War veterans on parade. The event was Armistice Day, now called Veteran's Day. The place: Providence, Rhode Island.

Too frail to march, all but one blue-clad figure was a passenger in an open car; he bravely sat astride a horse, but was held by the legs on both sides lest he fall off. Rising to the needs of the day, the old veterans sat up straight in their carefully sponged G.A.R. uniforms. They were the darlings of the crowd and a roar rippled down the street at their approach.

There were other military contingents; from the Indian Wars, maybe the Boxer Rebellion, surely the Spanish American War. And there were whole masses of Doughboys; the gassed ones waving from cars. The pride of America in review...but it was the Civil War boys who brought the lump to my throat, embarrassing moisture to my eye.

Now the moment has come to remember the G.I.s of World War II. What better way than through owning and studying the very weapons that were such an integral part of military life. When we hold our Garand or M1 Carbine or other infantry weapon of 1941-1945 we are touching surfaces once vital to a host of fighting men, in a sense, shaking hands by proxy with an era.

The weapons on the following pages were daily comrades-in-arms, indeed a way of life, a tool of survival, to a host of American young men. The fiercely aggressive "Cadre" of our Infantry basic training camps knew this. Recruits who neglected their rifles often were made to sleep with them — a dirty bore was worse than a dirty face. Dropping your rifle, your "piece" as they would have it, may not have brought down the wrath of God but it sure brought down fifty push-ups, just as bad as divine anger to a flabby first-weeker.

The serial number of your '03, or M1, had better be memorized quickly. Damn quickly. This information, along with your dog tag number and "The Orders of the Day" had to be available in a flash on demand, especially in the sleepy hours of guard duty. Stoking the coal-fired water heater was a common punishment for the tongue-tied. No laughing matter in the heat of Camp Blanding, Florida in July. Proficiency with the arm was guaranteed; you stayed on the range until you qualified, "Marksman," "Sharpshooter" or the much coveted "Expert." A wrenchingly sad fact of life took place when a carefully zeroed-in, molly-coddled Garand was turned in on completion of training — you were certain you would never get another so accurate, so faithful.

In combat, those with special skills beyond those of a basic rifleman were burdened with responsibility that hung heavy on a teenager. The machinegunner must protect his squad, his platoon, no matter what this represented in personal exposure to the enemy. The mortarman had to provide a precise umbrella for both attacks and retreats. The bazookaman performed his duty knowing his position was immediately compromised and that every tanker wanted HIM in their sights. Those entrusted with flame-throwers had to have nerves of steel. Just carrying one of these affairs was to become a walking bomb...a moment of carelessness or retaliation meant a fiery death.

During my 16 weeks of "Basic" and 6 weeks of "Jungle Warfare" (you guessed it, they sent me to Europe), I had the chance to build a personal relationship with just about everything on the following pages. Being the way I am, I enjoyed most of it except firing a rifle grenade from the shoulder. As part of the process of "The Army

Making a Man Out of You" the cadre insisted that each trainee appreciate just what recoil was all about — and the rifle grenade fired from the shoulder left no doubt as to who was the reigning champion of recoil.

In an editorial in the January/February 1993 issue of *Man at Arms,* I reminisced about my experiences with the Model of 1918 Browning Automatic Rifle. "The BAR shot well, even gently. The recoil was modest, almost disappearing in the excitement of firing. On the range, at least, it was a sweetheart. The deliberate rate of fire allowed short — one or two shot — bursts to be mastered almost instinctively. The design provided a solid and comfortable base for the marksman. However, the magazine tended to get in the way of maintaining a low profile; even with a skimpy 20-round capacity. And a supply of loaded magazines called for the services of a strong associate.

In spite of the shortcomings as I saw them, this was a satisfying object to use. In perfect order, that is. Unfortunately, the guns we took on the range had hopelessly shot-out barrels. Targets revealed that many of our BARs were 'key-holing.' The cadre said this made 'em more deadly, and I can't argue with that. Anyway, the Army wasn't about to waste time and precious materials on a bunch of lowly infantry replacements.

Where the BAR really got on my nerves was in the toting. It may have weighed a 'quite light' 16 pounds, but they were unpleasant pounds. Browning might have been a firearms genius, yet I think he harbored a secret grudge against the foot soldier. The gun was a brute to carry. Especially in August in good ol' Camp Blanding, Florida. There just wasn't a civilized way to carry the thing. It was all sharp edges and unpleasant protuberances.

Like all such things in the Army — and in common with mortar base-plates and bags of ammunition — the big lads in the platoon wanted nothing to do with the breed. The privilege was left to runts like me (I didn't think of myself as a 'runt' until I got a chance to carry a base-plate clutched to my chest while double-timing). The platoon scheme called for trading-off these heavy items from time to time while on the move. It was finding a willing recipient that was the problem. The big guys, mindful of tradition, didn't want to bruise their carefully acquired musculature and rejected their BAR responsibilities completely. They much preferred slinging over their shoulder the sight bag for the mortar, something that could have been entrusted to a good-sized house cat.

I came to appreciate a predisposition against heavy objects in addition to the normal 65 pound plus marching load expected, nay required, of an infantryman. The truth hit me during a fifteen mile 'speed' march in the heat of the day. It was confirmed shortly afterwards during a twenty-two mile version of the same thing which resulted in a Congressional Investigation of losses due to heat exhaustion. I soon came to wish I was 6'4" and around 225 pounds. I would have been prancing along with a trivial object with the best of them."

As I write this, time is catching up with the veterans of infantry warfare in WWII. Once lithe and flat-bellied, former GIs are seldom that nowadays. And the passing parade shows ever-thinning ranks. Soon the marchers, like the music, will fade away. But through these pages, the weapons — and the men who used them in Africa, Europe and the Pacific — will be enshrined forever.

E. Andrew Mowbray
Publisher, *Man at Arms* magazine
September, 1994

An interestingly posed WWII photograph of M1905 bayonets on M1 rifles. (U.S. Army)

Edged Weapons

The use of edged weapons for combat purposes has its roots in ancient history. For untold centuries, swords, spears, pikes and similar weapons were the mainstay of the foot soldier. However, with the introduction of firearms, the use of edged weaponry waned but never totally disappeared. From the time of their advent and for the next two centuries, firearms were usually single shot weapons that were both cumbersome and time consuming to reload. The bayonet became an important adjunct to the typical long arm of the time as it instantly transformed an unloaded and otherwise temporarily useless gun into an effective pike-type weapon. Other edged weapons such as swords lost most of their usefulness as weapons and became little more than symbols of rank or authority.

By the late 19th century, such technological advances as metallic cartridges and breech-loading, repeating weapons rendered bayonets less important. By the dawn of the 20th century, many "progressive" military minds felt that the days of the bayonet were numbered, if not already over. As an example, the first American military rifle adopted after the turn of the century, the famed M1903 Springfield, was designed with a flimsy rod bayonet rather than the sturdy knife bayonet used with its predecessor, the .30-40 Krag rifle. The major reason cited at the time for the elimination of the standard bayonet was that the clip loading capability of the new rifle rendered a bayonet superfluous. However, as mass production of the original M1903 was underway, the Japanese-Russian War of 1905 saw a number of occasions in which bayonets were used. This caused some influential people in the War Department, along with President Theodore Roosevelt, to reconsider the whole concept and the '03 was redesigned to accept a standard knife bayonet.

Less than a decade later, World War One made it apparent that the bayonet was still an important infantry weapon. As the fighting on the Western Front eventually settled into bloody and frustrating trench warfare, bayonets were widely used on both sides in the brutal close-quarter combat. In addition to the renewed use of bayonets, specialized combat knives, which soon came to be universally known as trench knives, were also procured and used.

When the United States entered the First World War, our standard service rifle was the M1903 Springfield. The bayonet adopted for use with the '03 was the Model 1905. The M1905 bayonet had a 16" blade which was marked with the initials of the manufacturer ("SA" or "RIA") and stamped with the year of production. All but the earliest examples were also serially numbered. The M1905 bayonet was made by the Springfield Armory and the Rock Island Arsenal. Prior to 1917, the blades were left bright. In 1917, the blades were finished in blue and, from 1918 and on, the blades were parkerized. The M1905 bayonets had walnut grips.

The Model of 1905 scabbard was adopted for use with the M1905 bayonet. This scabbard had a leather covered wooden body. Several different variants of the M1905 scabbard were produced. In 1910, an improved scabbard was adopted that had a woven fabric cover. Even after adoption of the M1910 scabbard, large numbers of modified M1905 leather scabbards remained in use.

As the demands of the war overwhelmed the manufacturing capabilities of Springfield and Rock Island, another source of rifles had to be found to arm the rapidly expanding American military. The British government had previously contracted with three American firms to produce the Pattern 1914 .303 caliber service rifle for Great Britain. The British contracts were being completed at about the time the U.S. was entering the war. It was soon decided to adopt a slightly modified version of the British P14 rifle in .30-06 caliber to supplement the M1903 rifle. The new

American service rifle was adopted as the Model of 1917 and was generally referred to as the Enfield in recognition of its English parentage. The M1917 rifle was produced by the same three firms that manufactured the P14 for the British: Winchester, Remington and Eddystone (an affiliate of Remington).

The M1917 bayonets were marked to indicate the maker (a circled "W" for Winchester or "Remington" in a circle) and the year of production.

The U.S. also adopted the P14's bayonet and gave it the same Model of 1917 designation. The M1917 bayonet had a 17⅛" blade and walnut grips. Early blades were bright finished or blued, but the vast majority were parkerized. The M1917 bayonet was carried in a scabbard constructed of green colored leather of which two variations exist.

In addition to being used with the M1917 rifle, the M1917 bayonet was authorized for use with the 12-gauge shotguns which were officially adopted during World War One as trench guns.

In addition to the M1905 and M1917 bayonets, several other types of edged weapons were adopted by the American armed forces during the First World War. When the U.S. became involved in the Philippines around the turn of the century as a result of the Spanish-American War, our troops were without an effective weapon for use in the jungle-type terrain encountered. A heavy bladed knife, based on a native Philippine weapon known as the "Bolo," was determined to be best suited for the purposes at hand. Several types of bolos were tested including combination bayonet/bolo designs. Eventually two types were standardized—the M1909 and the M1910. The M1909 Bolo had a heavy, bright finished 14" blade with a smooth walnut handle. A leather scabbard was adopted for use with this bolo. Some 17,540 M1909 bolos were made by the Springfield Armory from 1909 through 1915. These were marked "SA" and stamped with the year of production and a serial number.

The M1910 bolo was also made by the Springfield Armory, which turned out 59,095 of them from 1910 through 1917. The M1910 had a 10½" blade. All of the blades were bright finished until the final year of production when bluing was instituted. The M1910 bolos were also stamped "SA" and marked with a serial number and the year of production. A canvas covered leather scabbard was adopted for use with the M1910 bolo.

Both the M1909 and the M1910 bolos were placed back into production during World War One. However, since the Springfield Armory was heavily involved in manufacture of the M1903 rifle and the M1905 bayonet, contracts were given to several commercial firms for bolo production. The M1909 bolo was manufactured by the Fayette R. Plumb Company which turned out over 58,000 during the war. The M1910 bolo, restandardized as the Model 1917, was produced by Plumb and the American Cutlery Company. The bolos of both types were marked with the name of the maker and the year of production.

While the bolos proved to be useful tools and reasonably good weapons, the need existed for a more efficient combat knife. Since no knife meeting the needs of the Army was available, the Ordnance Department solicited designs from interested parties for the new trench knife. Only very general specifications were given for the new knife and the most important criteria was its ability to penetrate *German* overcoats.

Henry Disston & Sons of Philadelphia, Pennsylvania, submitted the design accepted by the Ordnance Department. The knife was quite unconventional and was actually little more than a sharpened spike attached to a walnut handle having a "D" shaped metal knuckle bow. The knife was adopted as the "Trench Knife, Model of 1917". A cylindrical green leather scabbard was issued with the new knife.

Several commercial firms including Disston, American Cutlery Company and the Onedia Community, Ltd. produced the M1917 trench knives. A very similar design, differing slightly in the configuration of the knuckle bow, was adopted as the "Trench Knife, Model 1918". This knife was produced mainly by the firm of Landers, Frary and Clark (LF&C).

The M1917/1918 trench knives saw wide use during the First World War but the design had a number of flaws. While the thin triangular blade had good penetrating ability, the knife was cumbersome and not well suited as a combat weapon.

On 1 June, 1918, the American Expeditionary Force (AEF) tested the M1917/1918 trench knife along with other trench knives of our allies and adversaries. These tests concluded with the statement that "...the model 1917, although a satisfactory knife, could be improved..."

The Ordnance Department's Division of Engineering working jointly with the AEF developed a trench knife which supposedly incorporated all of the favorable features of the various knives tested. The new design was adopted as the "Trench Knife, Model 1918, Mark I." This knife had a 6½" flat double edged blade affixed to a cast brass and bronze handle of the typical brass knuckle configuration. The pommel featured a metal protrusion to function as a "skull crusher." The Mark I was issued with a stamped sheet metal scabbard. The blade was finished in dark blue-black

and the handle and scabbard were chemically blackened.

The Ordnance Department contracted for some 1,232,780 Mark I knives with the firms of Landers, Frary & Clark, Henry Disston & Sons, Onedia Community, Ltd. and A.A. Simon & Son.

While the American firms were tooling up for manufacture of the Mark I knives, the U.S. Army contracted with a French firm to produce a version of the knife in order to get some of the weapons into the hands of our troops as soon as possible. While similar in configuration to the American-made Mark I, the French version is easily identifiable. The blade was left bright and the handle retained its brass finish. The knife was issued with a blued steel scabbard rather than the stamped sheet metal variety. The handle was marked "U.S. 1918" and the blade was stamped on the ricasso with the figure of a reclining lion over the words "Au Lion".

With the coming of the Armistice, contracts for the Mark I trench knives were cancelled. Only LF&C had gotten into quantity production before the end of the war and the firm delivered 119,424 knives to the government. The other firms had a combined production of less than 20,000 Mark I trench knives. The number of French made Mark I knives is not known but these knives seem to be a bit scarcer than the LF&C variety.

With the end of the First World War, the United States had over 250,000 trench knives of the various models (M1917, M1918, M1918 Mark I) on hand in addition to the rather large number of bolos. The M1917 bolo and the M1918 Mark I trench knife were declared as standard. During the next several years, discussion was carried on to determine what to do with these weapons. In 1927, it was decided to declare the M1917 bolo as Limited Standard, which meant that no other weapons of this type would be procured after the existing supply was exhausted. Very few of these weapons remained in inventory by the time of Pearl Harbor.

Also in 1927, it was recommended that the M1918 Mark I trench knife be retained as standard and the other types of trench knives be declared obsolete. However, there was some doubt expressed as to the need for continued issue of a trench knife and the Mark I was also designated as Limited Standard.

On the eve of the Second World War, the United States military possessed essentially the same types of edged weapons as used during World War One. As we will soon see, a number of new types of bayonets and combat knives were adopted and manufactured in large numbers during World War Two.

World War Two Bayonets

M1905 Bayonet

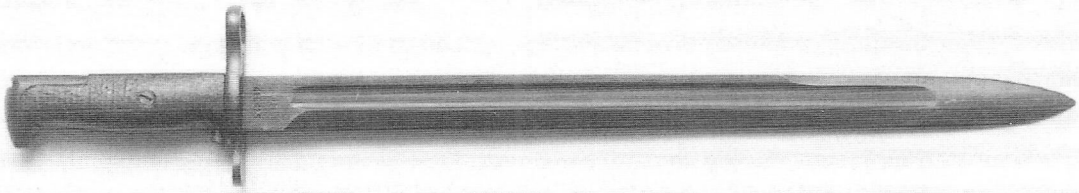
The standard service rifle at the time of America's entry into World War Two was the M1 Garand. The M1 was standardized in 1936 and the M1905 bayonet was adopted for issue with the weapon. The supply of M1905 bayonets produced prior to and during the First World War was sufficient to meet the requirements for bayonets existing at the time of the Garand's adoption.

Just before America's entrance into the Second World War, plans were formulated to greatly increase production of the M1 rifle. The M1 was manufactured during the war by the Springfield Armory and the Winchester Repeating Arms Company. In order to augment the supply of rifles, the M1903 was placed back into production in late 1941. The Remington Arms Company manufactured the M1903 rifle and the M1903A3 and M1903A4 variants. A contract was also given to Smith-Corona for production of M1903A3 rifles.

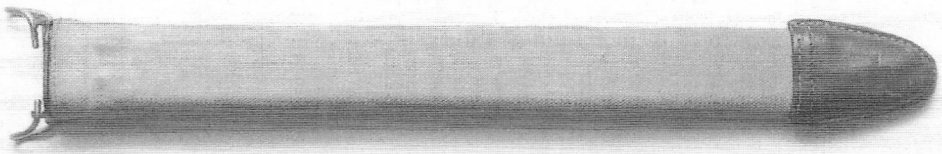
The enormous increase in rifle production also meant a corresponding number of bayonets would be needed and the available supply of pre-1919 M1905 bayonets would quickly be exhausted. The M1905 bayonets had previously been produced at the Springfield Armory and the Rock Island Arsenal, but these two government operated facilities were too burdened with munition production to tool up to manufacture bayonets.

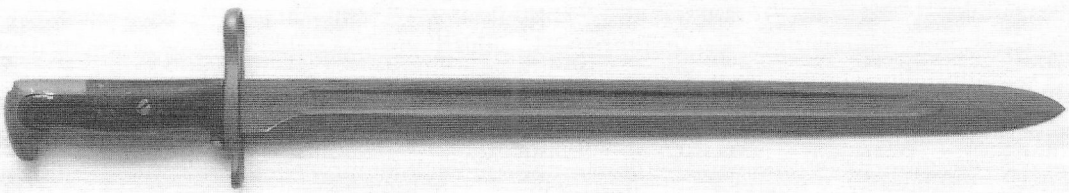
In the summer of 1941, the Ordnance Department began negotiations with several commercial firms for production of M1905 bayonets. The following three firms were awarded contracts to produce M1905 bayonets in the stated quantities:

Union Fork & Hoe Company.....440,336 bayonets
Utica Cutlery Company.....200,000 bayonets
Wilde Drop Forge
& Tool Company.....60,000 bayonets

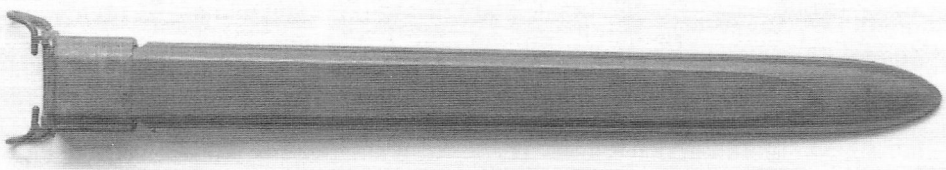


WWI production M1905 bayonet with M1910 scabbard.

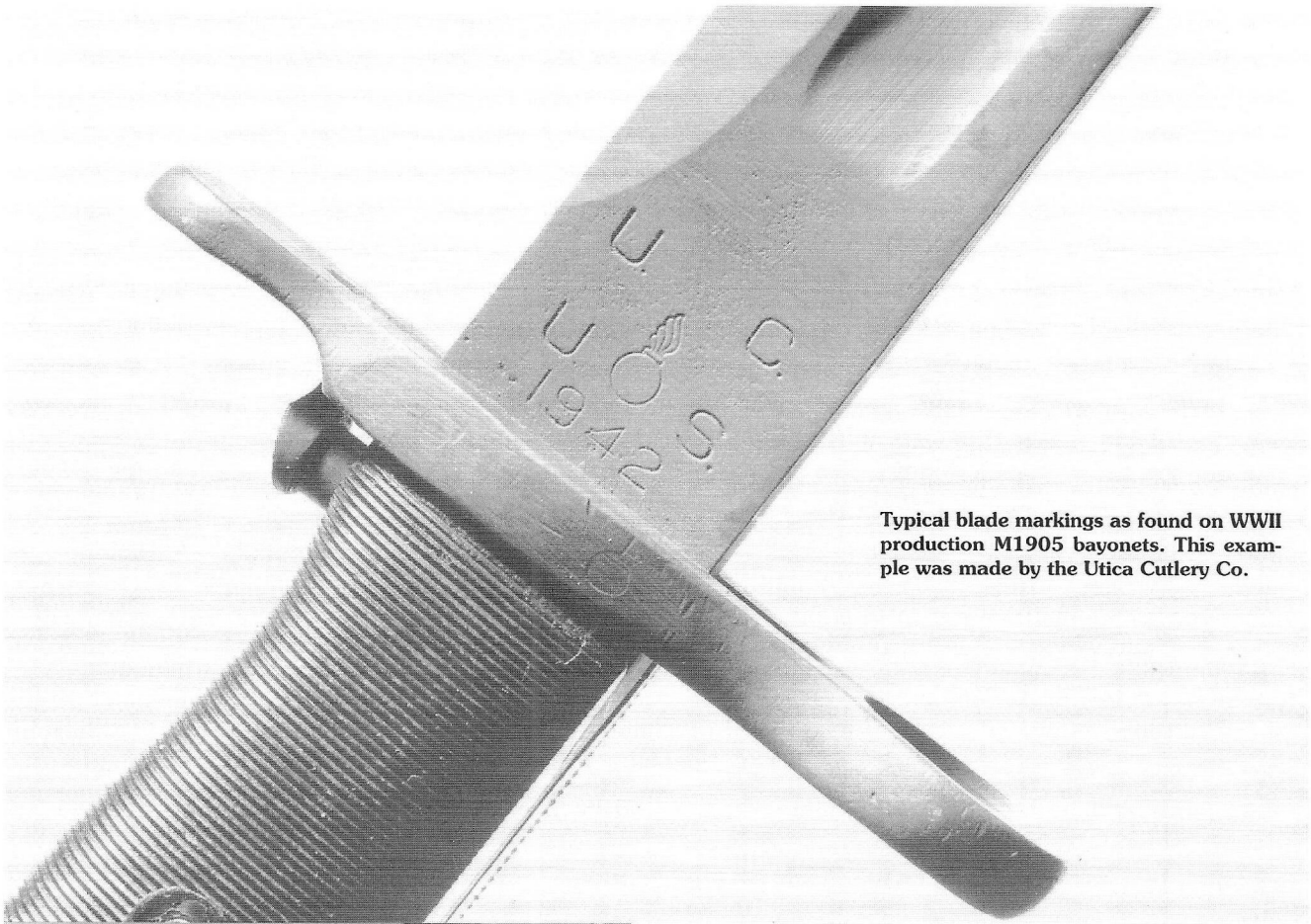




WWII production M1905 bayonet with plastic M3 scabbard.



Army troops in the Pacific. Note the solider firing his M1 rifle with fixed M1905 bayonet. (U.S. Army)



Typical blade markings as found on WWII production M1905 bayonets. This example was made by the Utica Cutlery Co.

The firms were expected to begin initial deliveries of bayonets in January of 1942. The attack on Pearl Harbor and the subsequent increased need for armaments caused an increase in the projected demand for M1905 bayonets. In early 1942, three more firms were awarded production contracts:

American Fork & Hoe .....200,000 bayonets
Pal Blade & Tool Company.....200,000 bayonets
Oneida, Ltd. .....100,000 bayonets

Although initial deliveries of M1905 bayonets were expected in January of 1942, production difficulties and shortages of raw materials delayed the first deliveries until April. However, only 82 bayonets were delivered in that month and quantity production did not really get under way until September. By February

(left) Marine Corps private, San Diego, 1943, preparing his pack. The M1905 bayonet, with plastic grips, is carried in a WWII vintage M3 composition (plastic) scabbard attached to the pack.
(National Archives)

of 1943, production of M1905 bayonets reached 228,772 per month. The last M1905 bayonets were produced in May of 1943.

The World War Two M1905 bayonets differed from the earlier arsenal made bayonets in several respects. The bayonets were not as well made as the finely crafted Springfield and Rock Island bayonets. As a further concession to increased production speed and reduced cost, the wooden grips of the earlier bayonets were replaced by plastic grips. The pre-war Springfield and Rock Island bayonets were marked "U.S." and a serial number on the obverse ricasso and the initials of the maker ("SA" or "RIA"), the Ordnance flaming bomb insignia and the date of production on the reverse ricasso. The World War Two bayonets were marked with the initials of the maker (i.e., "U C" for Utica Cutlery), a flaming bomb flanked by "U S" and the year of production (i.e., "1942") on the reverse ricasso. The obverse was unmarked.

Some of the World War Two bayonets were rejected by government inspectors for having blades which proved too brittle. However, the majority of the WWII bayonets were as serviceable as their pre-war arsenal made counterparts.

Some writers and collectors today refer to these World War Two bayonets as the Model 1942, but this is incorrect. The M1905 designation remained the official nomenclature throughout the life of the bayonet. A total of 1,540,578 M1905 bayonets were manufactured during World War Two.

The greatly increased production of M1905 bayonets naturally meant that sufficient numbers of scabbards were required for issue with them. Just prior to the war, it was found that only some 6,000 M1910 bayonet scabbards were on hand which was obviously woefully inadequate. It was discovered that approximately 48,000 M1905 Modified scabbards were in inventory although these had not been classified as standard since 1924. A number of M1917 bayonet scabbards were also on hand that could be used with the M1905 bayonet if necessary. Therefore, the M1905 Modified and the M1917 scabbards were classified as Limited Standard to supplement the small supply of the standard M1910 scabbards.

The earlier leather scabbards and cotton-webbed M1910 scabbards were found to be prone to deterioration. Development was ordered on an improved type of bayonet scabbard while contracts were given to several firms for interim production of M1910 scabbards to help alleviate the shortage.

A commercial firm, the Beckwith Manufacturing Company, submitted a plastic bayonet scabbard to the Ordnance Department for testing. Preliminary testing revealed that the plastic scabbard was far superior to the M1910 and earlier types and the design was adopted as the M3 bayonet scabbard. On November 17, 1941, contracts were given to Beckwith and the Detroit Gasket & Manufacturing Company for production of M3 scabbards. With the adoption of the M3, the M1910 scabbard was made Substitute Standard and the M1905 Modified and M1917 scabbards remained Limited Standard for use with the M1905 bayonet.

Production of M1905 bayonets and M3 scabbards lagged behind the production of M1 and M1903 rifles and in April of 1942 the Ordnance Department ordered "...not to hold up shipment of rifles; to let the rifles be shipped and bayonets would be shipped as soon as available."

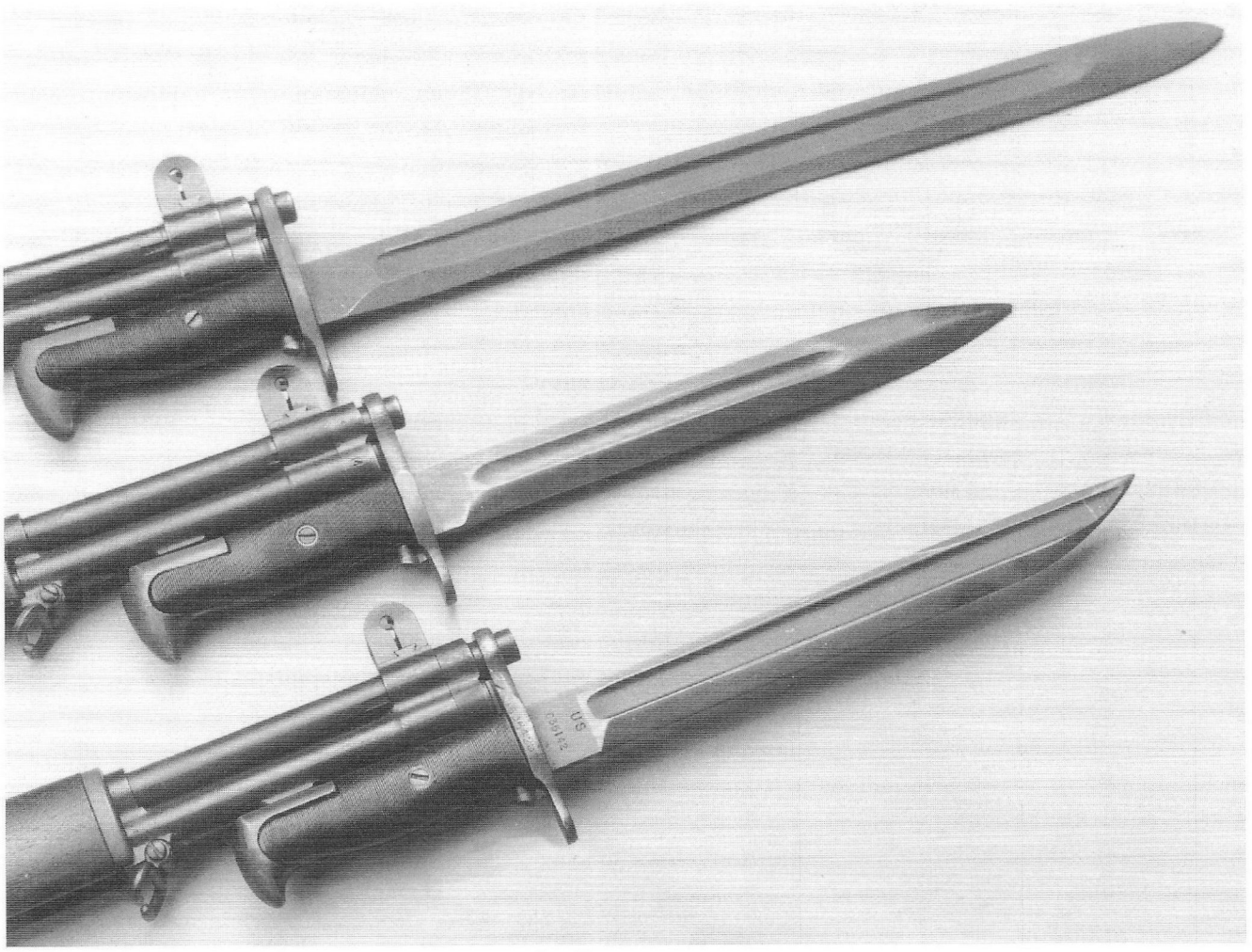
The M1905 bayonets, both the pre-war arsenal models as well as the World War Two contract bayonets, were widely used during the war with both the M1 rifles and the '03 variants. Large numbers of the earlier M1905 bayonets were refurbished during the war at various ordnance facilities and under contract by some commercial firms. Generally, the refurbishing process consisted of refinishing the metal in the typical grayish parkerizing of the period and replacing the earlier wooden grips with the later plastic variety.

M1 Bayonet

While the M1905 bayonet was a serviceable weapon, its long blade came in for some criticism. The most common complaint was that the 16" blade made the bayonet an uncomfortable and cumbersome item to troops riding in trucks and other vehicles. Also, the reduced emphasis on bayonet fighting during World War Two downplayed the importance of the long blade.

In late 1942, the Cavalry Board formally requested a bayonet better suited than the M1905 for use by troops riding in vehicles and which could be more comfortably carried on the cartridge belt. It was determined that a bayonet similar to the M1905 but with a shorter 10" blade would provide essentially the same utility as the 16" blade while being more compact and

(opposite page, top left) WWII U.S. soldier on sentry duty armed with an M1903 Springfield rifle and M1905 bayonet. (top right) Army troops on the move in WWII. Their M1905 bayonets are carried in early style M1910 canvas and leather scabbards. (bottom) U.S. soldier in cold weather gear armed with an M1 rifle. Note the M1905 bayonet in an M1917 scabbard behind his left shoulder. It is not generally known that the M1917 scabbard was authorized for use with both the M1917 and M1905 bayonets. (All three photos courtesy U.S. Army)



World War II Garand rifle bayonets. (top) M1905 bayonet, WWII production, (center) M1 bayonet, (bottom) M1 (M1905E1) bayonet made from pre-war M1905 bayonet.

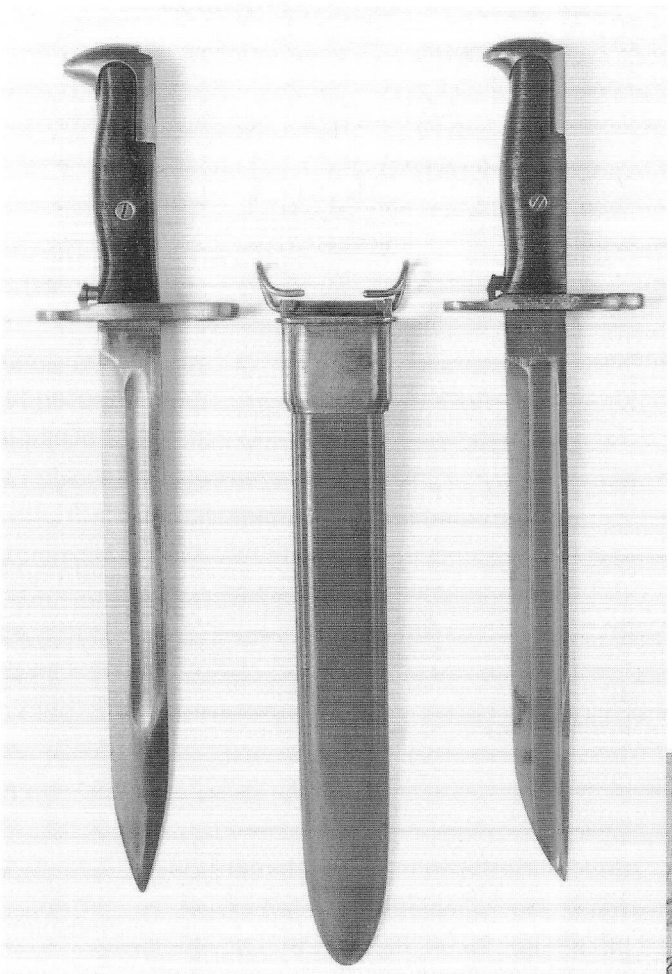
less unwieldy. In addition, the substitution of a 10" blade in place of the 16" blade would save a lot of critically needed steel. A number of WWII-produced M1905 bayonets had their blades shortened to 10" for use in field trials by the First Cavalry Division. The shortened bayonet was designated as the "Bayonet, M1905E1." The field test reported stated that

The modified bayonet has been tested over a period of [two] months. The short bayonet is perfectly balanced and on the rifle makes a well-balanced weapon, easier to handle, hence fast in combat. It is preferable from this point of view to the long bayonet (the M1905) which makes the rifle muzzle heavy...As a hand weapon, it was found perfectly balanced, a fast thrusting and cutting weapon and a strong weapon for hitting with the butt. It is an excellent hand weapon suitable for use by all personnel for hand-to-hand combat and in the dark.

The Infantry Board concurred with the results of the Cavalry's tests and the M1905E1 was standardized as the "Bayonet, M1" on February 11, 1943. The manufacturers of the M1905 bayonet were given 30 days to change over to production of the new M1 bayonet. With the adoption of the M1 bayonet, the M1905 was reclassified as Limited Standard.

The M1 bayonet, like the M1905, was authorized for use with the M1 and M1903 rifles. The new bayonet was essentially identical to the World War Two M1905 bayonet except for the shorter blade. Most of the bayonets had black plastic grips, but some were produced with brown plastic grips.

Production of the new M1 bayonet began in April of 1943 (94,869 made that month) with the peak production from May through October of the same year. Beginning in June of 1943, manufacturing schedules were reduced but the bayonet remained in production through August of 1945. The total number of M1 bay-



M1 bayonets with WWII M7 scabbard. (left) Standard production M1 bayonet. (right) Bayonet produced from an M1905 model ("M1905E1") with "Bowie tip."

Marines in the Pacific. Note the M1 bayonet on the M1 rifle in the foreground. (U.S. Marine Corps)

Marine firing his M1 rifle with fixed M1 bayonet. Note the M7 scabbard on the left side of his pack. (U.S. Marine Corps)

onets manufactured during World War Two was 2,948,649.

While production shifted from the M1905 to the M1 bayonet, the Ordnance Department contracted with several commercial firms to modify the M1905 bayonets on hand to M1 specs. This was done by simply grinding off 6" of the blade and retipping it. Most modified bayonets were made with the same type of spear point as found on the M1 bayonet, but some were modified with a so-called "Bowie point." The modified M1905 bayonets can be easily distinguished from the original M1 bayonets as the fuller (a.k.a. "blood groove") runs the entire length of the blade. On the original M1 bayonet, the fuller stops about 3" from the tip. A total of 1,007,671 M1905 bayonets (both the earlier arsenal made bayonets as well as those made in 1942) were modified during the war into the M1 pattern. The initials of the commercial firm doing the modification work were usually stamped into the metal on top of the handle.

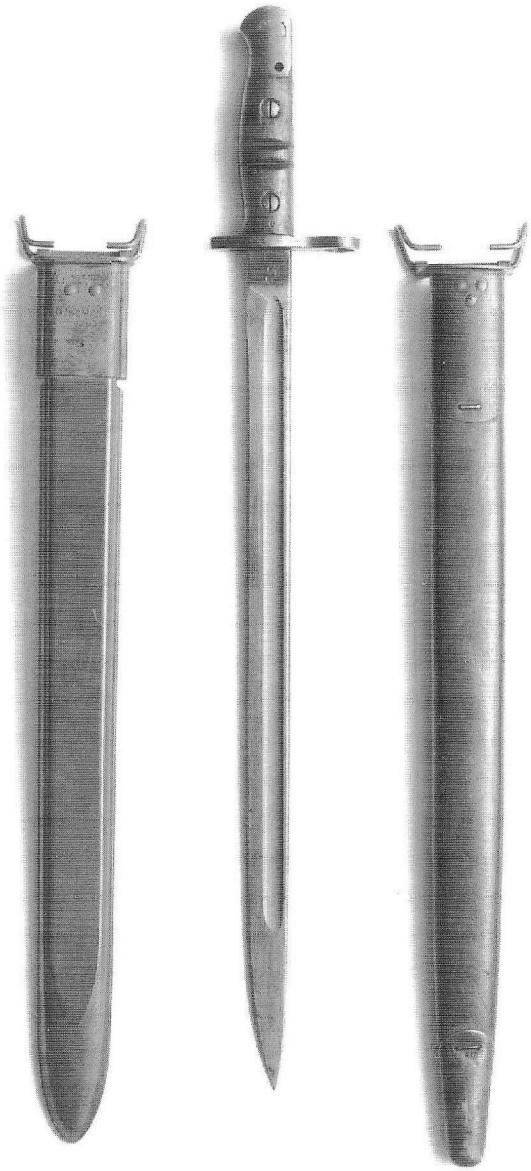
Since a scabbard compatible with the new M1 bayonet was needed, a shortened version of the M3 scabbard was standardized as the M3A1 on February 10, 1943. On April 6, 1943, the designation was changed to M7. Some of the long M3 scabbards were modified to the shorter M7 length but most of the scabbards procured for issue with the M1 bayonets were newly made. Other than the shorter length, these scabbards were identical to the M3 scabbard.

The M1 bayonet was the most widely issued American bayonet of World War Two. Although the M1905 was downgraded to Limited Standard, not all of these bayonets were modified to M1 specifications and some remained in use through the end of the war.

M1917 Bayonet

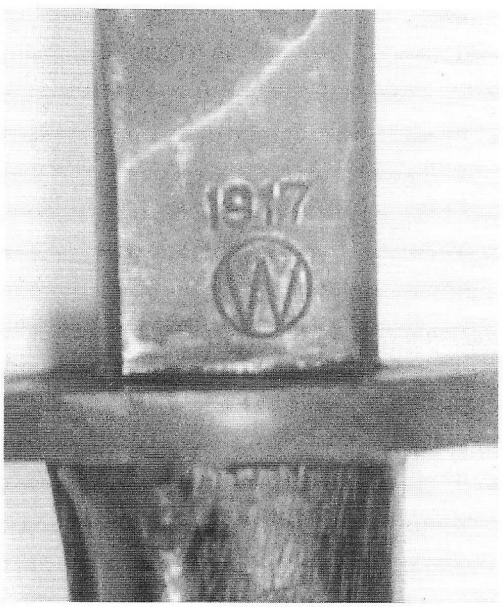
Although the M1917 rifle had been widely used during the First World War, it was relegated to the war reserve stockpile after 1918. Many thousands of these rifles were supplied to the British during the early days of World War Two for use by their Home Guard units. When the United States became actively involved in the war, the M1917 rifles were utilized chiefly as training arms and supplemental service rifles.

As we will subsequently discuss, no M1917 rifles were produced after 1919 although many thousands



(left) M1917 "Enfield" bayonet flanked by World War I vintage green leather scabbard and late World War II plastic scabbard.

(below) Typical blade markings found on M1917 bayonet as manufactured by Winchester in 1917. Winchester and Remington produced very large numbers of these bayonets during the First World War era. There was a sufficient supply of M1917 bayonets on hand to meet the needs of our armed forces during World War II and the weapon was not put back into production.



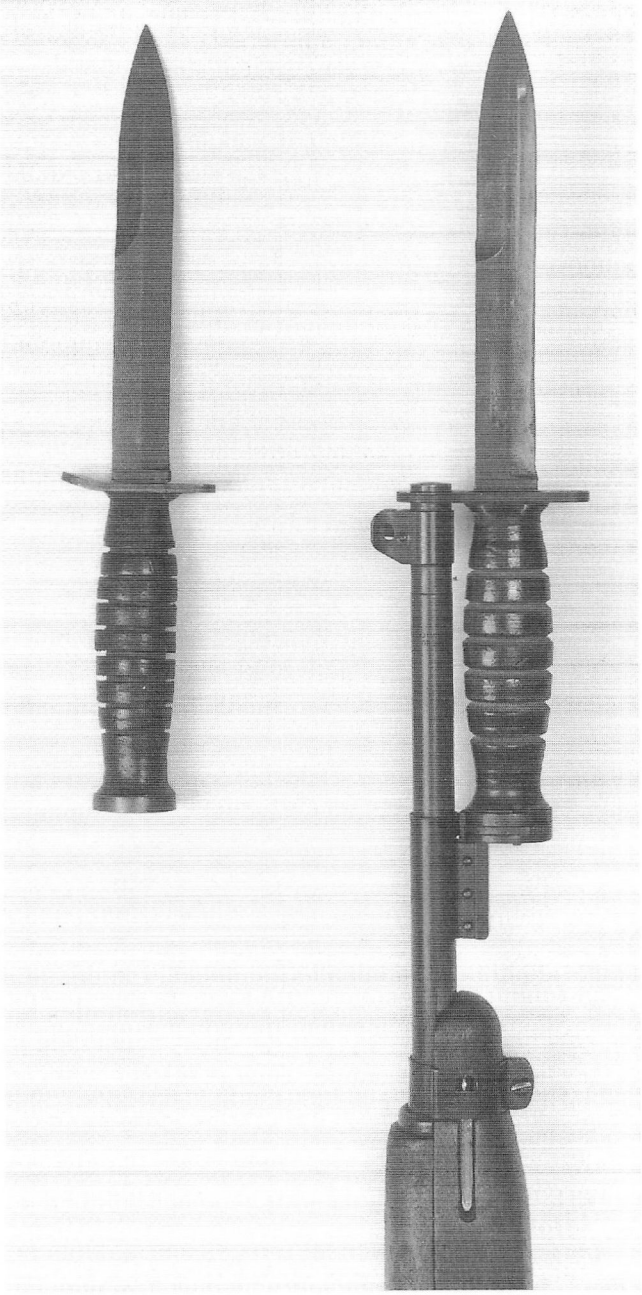
were rebuilt and refurbished for use in World War Two. Likewise, no M1917 bayonets were made after 1919 and sufficient numbers were on hand during WWII to meet the demand. In addition to being used with the M1917 rifles, the M1917 bayonet was utilized with the various types of trench guns, which were riot type shotguns equipped with bayonet adapters.

A number of M1917 bayonets were refurbished during World War Two. This process consisted generally of refinishing the blades with new parkerizing. While the supply of M1917 bayonets on hand was sufficient to meet the demand, many of the leather scabbards had deteriorated. By late 1944, the Ordnance Department issued a requirement for new production M1917 bayonet scabbards. The new type of scabbard was similar to the plastic M3 scabbard. Interestingly, the new type of scabbard was not given a new Model designation and retained the original M1917 nomenclature. Production of the new pattern M1917 scabbard began in January of 1945 and a total of 179,000 had been produced when production stopped in April of 1945. During the Vietnam War, a virtually identical type of scabbard was placed back into production to meet the increased demand for M1917 bayonets used with a number of shotguns during this era.

Obviously, few of the M1917 plastic scabbards were issued during World War Two due to its late production period. Virtually all of the M1917 bayonets issued with the M1917 rifles and trench guns were carried in their original World War One vintage green leather scabbards.

(left) M3 Trench Knife, (right) M4 Bayonet-knife.

As can clearly be seen, the M4 bayonet was based on the design of the M3 trench knife.



M4 Bayonet-Knife

When the M1 Carbine was originally adopted in late 1941, the weapon did not have any provision for a bayonet. The M3 trench knife (discussed in the combat knives section) was approved for issue to troops armed with carbines. By late 1943 or early 1944, the using services determined that a bayonet would be a useful addition to the carbine. Several prototype designs were tested. The first type, designated as the T4 had a round spike-type blade which clamped onto the carbine's barrel. A very similar design with a slightly different blade configuration was tested as the T5. The final version, the T6, had the same type of conventional blade as used on the M3 trench knife. An improved design which was essentially an M3 trench knife with a modified guard and locking mechanism on the pommel was designated as the T8. The design was further refined and tested as the T8E1. All of the prototypes were tested by the Infantry Board in January of 1944 and the T8E1 was recommended for adoption. It was also recommended that the T8E1 replace the M3 trench knife. The design was standardized in April of 1944 as the "M4 Bayonet-Knife."

A modified front band (the T4) was developed for the carbine which included a bayonet lug. The T4 band was added to new production carbines late in the weapon's production run and relatively few carbines were issued with this feature. However, as the earlier carbines were rebuilt during and after World War Two, the T4 band was added and most carbines seen today have this feature.

The M4 Bayonet-Knife was issued with the M8 and M8A1 scabbards. The M8 scabbard had been standardized in July of 1943 for use with the M3 trench knife. It had a similar type of plastic body as the M7 scabbard but utilized a web belt loop which restricted its use to the pistol belt. The M8 was replaced by the M8A1 which was of the same basic type of construction but had belt hooks which allowed it to be used equally well on pistol belts and cartridge belts.

The first batch of 500 M4 Bayonet-Knives was produced in July of 1944, but quantity production did not get underway until September. By December of 1944, production had reached a peak of 285,771. A total of 2,260,519 M4 Bayonet-Knives was produced

(opposite page)

World War II production M4 Bayonet-Knife and M8A1 scabbard.

Troops of the 194th Infantry Glider Regiment prior to the Rhine drop, 1945. The knives used in "shaving" the heads of the troops are the newly issued M-4 Bayonet-Knife. This weapon was based closely on the issue M3 trench knife and was intended for use with the .30 cal. carbines equipped with the T4 front bayonet having an integral bayonet lug. (U.S. Army)

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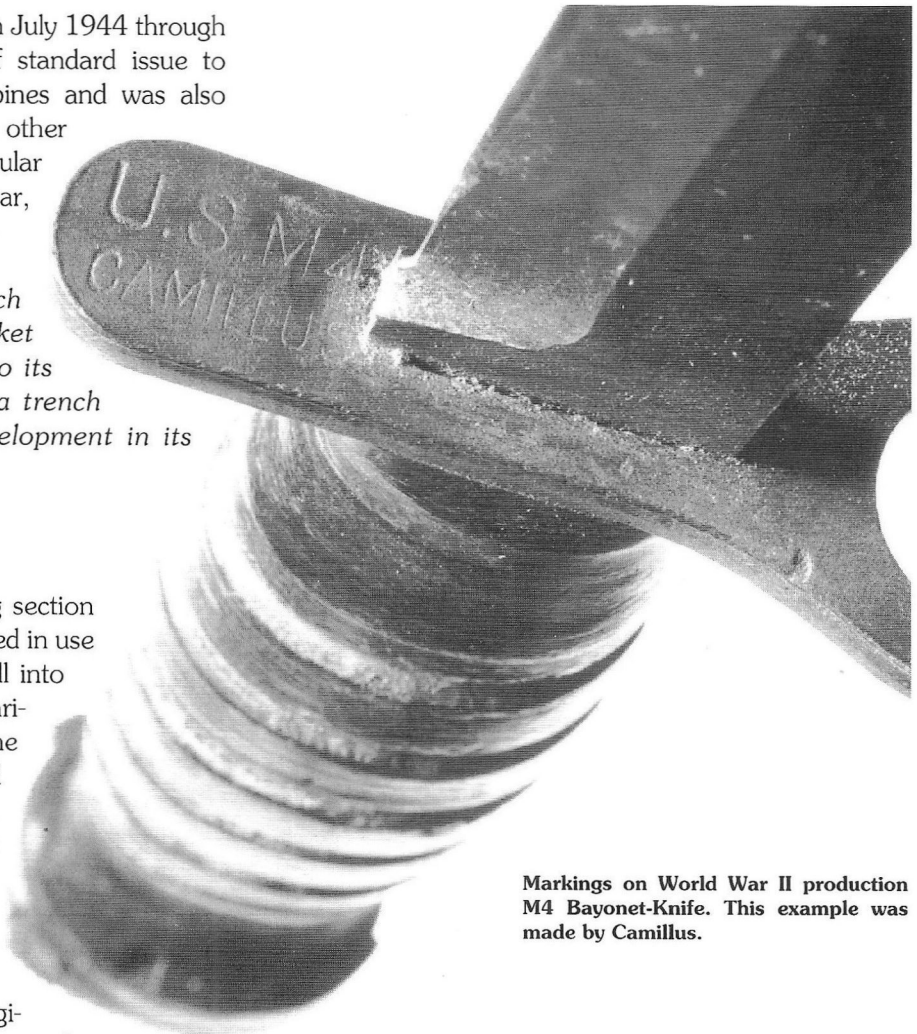
during the Second World War from July 1944 through August 1945. It was an item of standard issue to troops armed with the later carbines and was also issued to many troops armed with other weapons. It proved to be a popular and practical weapon. After the war, an Ordnance Department document commented that

The Bayonet-Knife, M4...which could readily substitue for a pocket knife on occasion, in addition to its manifold uses as a bayonet or a trench knife...was the outstanding development in its field of World War II.

Since the M4 Bayonet-Knife was based on the M3 trench knife, additional details on the weapon are given in the following section on combat knives. The M4 remained in use with the M1 and M2 carbines well into the Vietnam War era. Several variants exist which differ chiefly in the type of grip. The original World War Two variants had grooved leather grips while later issue M4s used plastic grips. Some wooden or rubber grips have been observed on rebuilt M4 bayonets to replace the original leather grips which had deteriorated. Original WWII M4 bayonets are not extremely common today and are desirable collector items. The later M4 bayonets are much more common and usually less expensive.



Markings on World War II production M4 Bayonet-Knife. This example was made by Camillus.

U.S. Army sergeant, probably post-WWII, armed with an M3 submachine gun. Note the M4 Bayonet-Knife on his belt. Although developed for use with later versions of the M1 carbine, the M4 was also issued as a replacement for the very similar M3 trench knife. (U.S. Army)

Model 1941 Johnson Rifle Bayonet

The only other United States bayonet to be issued during World War Two was for the M1941 Johnson rifle. The Johnson was a unique semiautomatic recoil operated rifle which saw use in very limited numbers by special units of the Marine Corps during the war. The Johnson rifle will be examined at length later in this book.

The unusual recoil operated action of the Johnson rifle required that the barrel slide back and forth with each shot. If a standard bayonet was attached to the rifle's barrel, the weight would cause the weapon to malfunction. In order to meet the requirement that the rifle be equipped with a bayonet, a very light weight design was developed. The resulting all metal bayonet was a simple triangular blade and grip forged from a single bar of steel. The blade was only some six inches long and the bayonet weighed just over one third of a pound. The entire bayonet was parkerized.

The bayonet was attached to the rifle's bayonet lug and held in place by a spring steel catch. Most Johnson rifle bayonets are unmarked, but some may be found stamped with a serial number which doesn't relate to the rifle's serial number. The Johnson rifle bayonet was issued with a simple cylindrical all leather sheath having a narrow belt loop.

It is clear that the bayonet was designed to satisfy an arbitrary requirement rather than to serve as a useful or practical weapon. The Johnson rifle bayonet had virtually no utility as a tool and little (or no) value as a weapon. During World War Two, some Marines derisively referred to the Johnson rifle bayonets as "tent pegs."

The Johnson rifle and its bayonet dropped from Marine Corps use well before the end of the war. Such bayonets are not extremely common today and are interesting collectibles.

As stated, the military doctrines of the Second World War down played the role of the bayonet when compared to previous wars. More efficient weaponry and the resulting changes in tactics ensured that massed bayonet charges were a thing of the past. However, bayonet fighting during World War Two was not an unheard occurrence. Numerous government documents as well as first person accounts confirm that bayonets were employed in a number of battles, albeit usually on a small scale. One illustrative example is related in the official Marine Corps account of the fighting on Guam, in which it is related that

Companies I and K, rushing the Japanese, drove steadily forward along the ridge, destroyed everything in their path, and charged the last emplacements with bayonets...

Countless other reports and documents relate similar instances in which bayonets were used with deadly effectiveness during the war. On the other hand, it is entirely true that the vast majority of bayonets were used for such mundane chores as opening ration cans. However, as pointed out in the article "The Evolution of the Post-Civil War U.S. Bayonet":

However, when called upon to be fixed to the end of a rifle and wielded in anger, it was still a weapon to be reckoned with. The fact that a soldier carrying a bayonet would never be completely unarmed had to give the front line combat troops some measure of confidence.

Many pundits and self-styled experts have declared the bayonet a hopelessly obsolete and useless weapon since the days of the American Civil War. Although it was far from being a vital weapon of World War Two, it nevertheless played an important supporting role. The fact that some 6,749,746 of all types were manufactured during WWII (in addition to the hundreds of thousands of bayonets produced previously) certainly makes it clear that the U.S. military required extremely large numbers of bayonets. This is hardly indicative of an obsolete and useless weapon. As a post-WWII Ordnance Department report on the bayonet correctly concluded that

...it was frequently found that the bayonet was the only weapon which could force enemy infantrymen to yield vital disputed positions.

(above) Model of 1941 Johnson Rifle Bayonet and leather scabbard. This lightweight all-metal bayonet was designed to allow the recoil operated Johnson rifle to function with the bayonet attached. It had little utility as either a weapon or a tool.

Army troops "training" with M3 trench knife. (U.S. Army)

Combat Knives

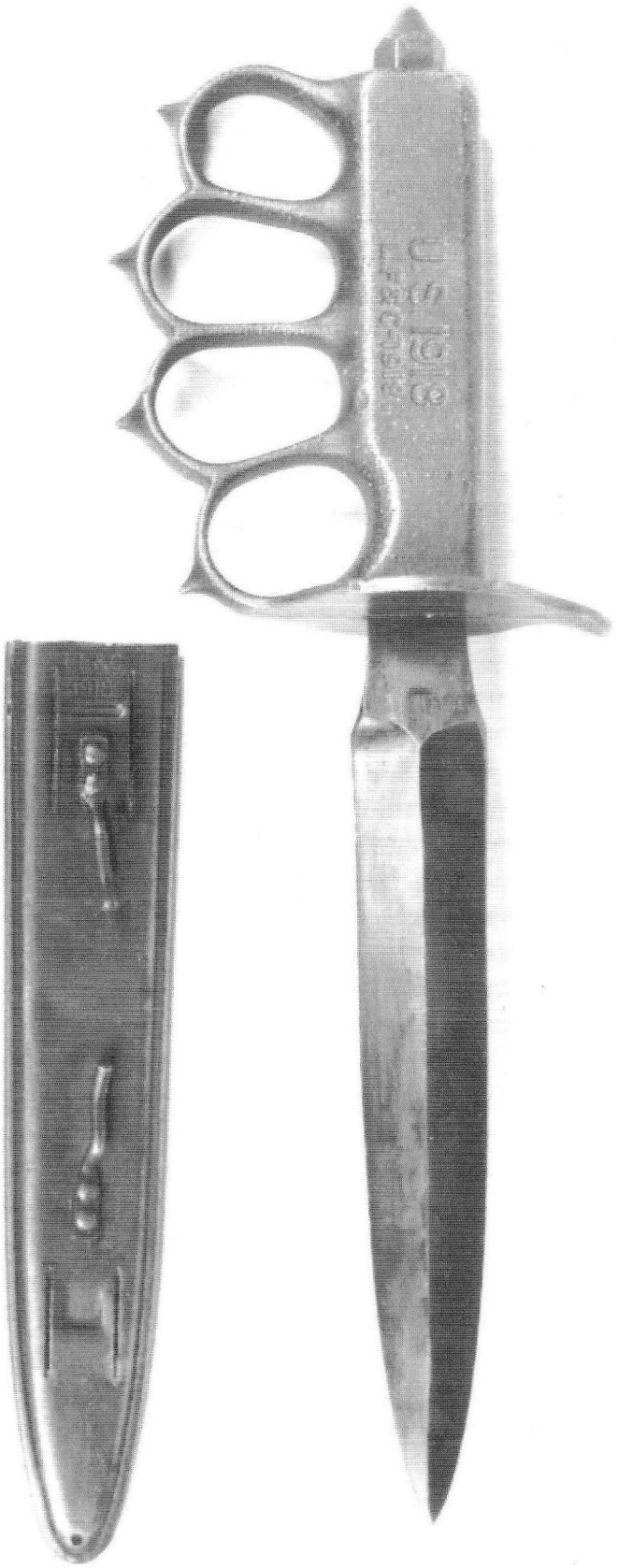
Although the term "combat knife" was never an official designation, several types of knives were designed and procured for use as combat weapons. Many other types of knives were produced for our armed forces during the war. Most of these were utility or work blades and are not discussed in this book since the emphasis is on infantry weapons intended for combat use. This is certainly not to imply that such knives were never carried by combat infantrymen as they certainly were (along with myriad privately procured knives). However, the focus of this section is on the knives designed and intended for combat use. The combat knives used by the U.S. Army and U.S. Marine Corps are discussed separately.

U.S. Army Combat Knives

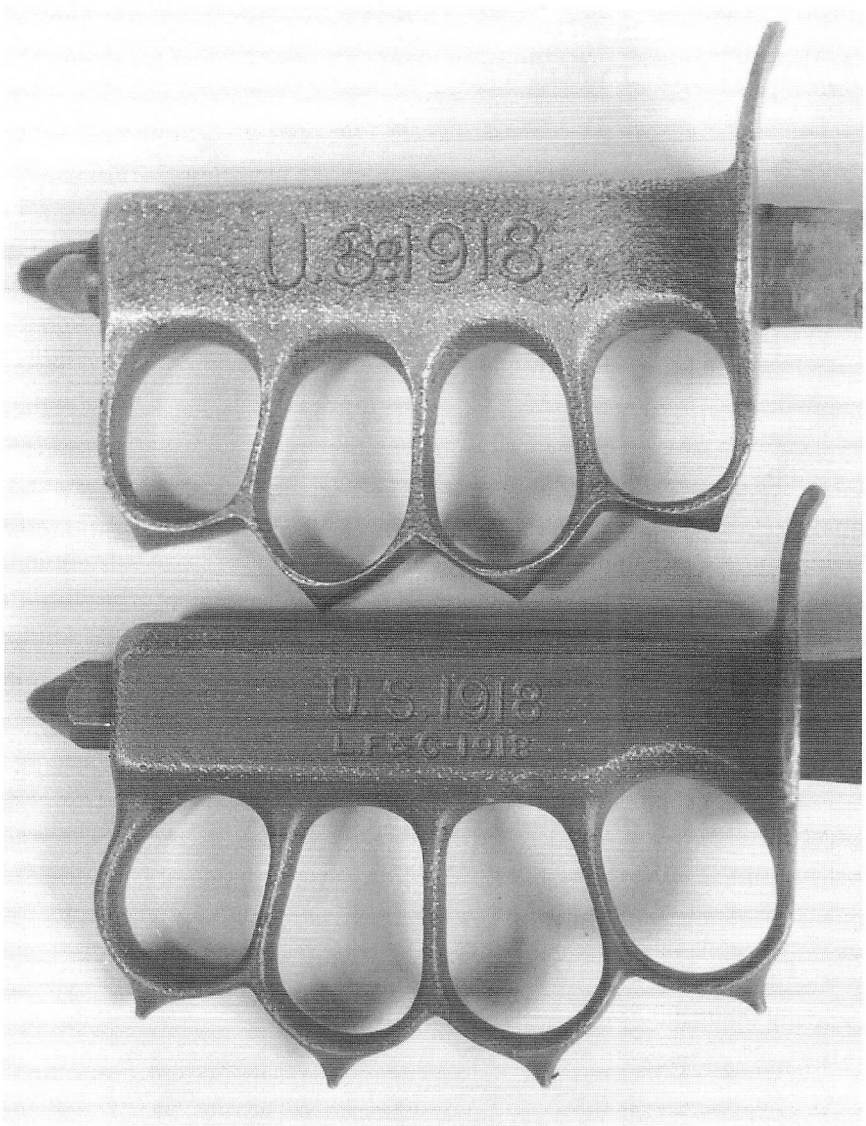
M1918 Mark I Trench Knife

It is interesting to note that at the time of America's entry into the Second World War, the only type of knife designated as Standard was the M2 pocket knife. This knife was adopted for use by paratroopers in cutting shroud lines, etc., and had little or no application as a combat weapon. Although it had been declared as Limited Standard in 1927, the only type of combat knife existing in any appreciable numbers (approximately 139,000) in our inventory at this time was the M1918 Mark I trench knife.

In February of 1942, requests began to come in to the Ordnance Department for combat knives. Upon the Infantry Board's recommendation, the Ordnance Department immediately proceeded with a program to provide a standard combat knife for the Army's needs. In order to meet the short-term demand, the M1918 Mark I trench knives in inventory were issued. Special purpose troops such as paratroopers and Ranger units had priority for these knives and thousands were issued and used early in the war. The Ordnance Department initially considered re-standardizing the M1918 Mark I trench knife and placing it back into production. This idea was soon discarded, however, for several reasons. The Mark I was not an ideal fighting knife as it could only be used in the "clenched fist" mode. This limited its application in hand-to-hand



M1918 Mark I trench knife and scabbard. Although developed during World War I, this weapon saw most of its use in the early days of the Second World War.

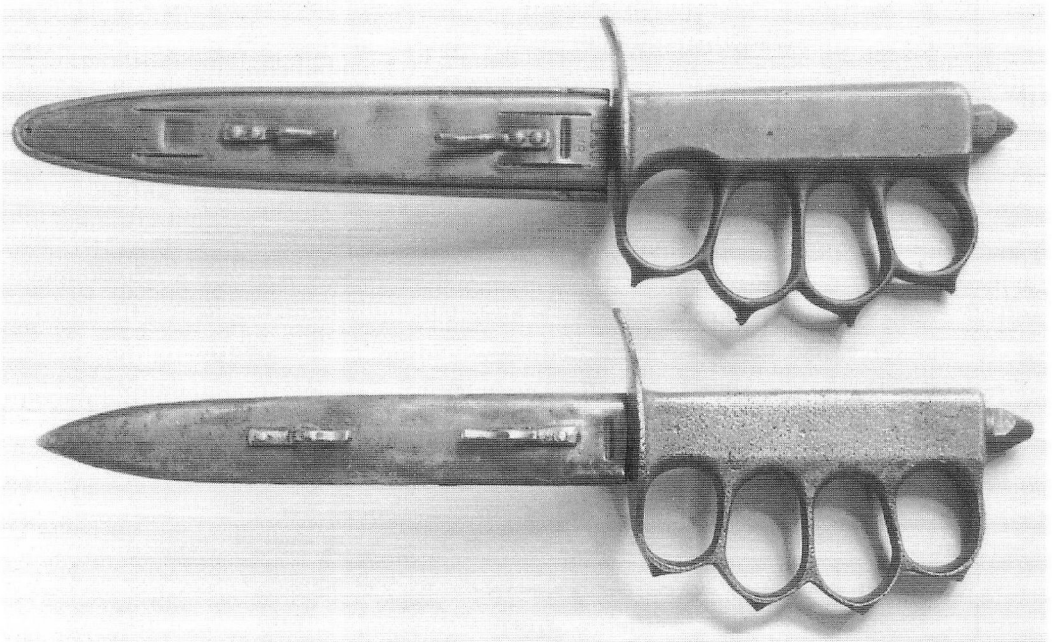


While American firms were tooling up for manufacture of M1918 Mark I knives, a French company was contracted to get some knives in the hands of the troops quickly. The French version can be differentiated from the Landers, Frary & Clark American-made knives by its bright blade, the brass finish of its handle and its markings.

(left, top)
Hilt of French-made M1918 Mark I.

(left bottom)
Hilt of U.S. made LF&C M1918 Mark I trench knife.

(above)
Blade marking on French-made M1918 Mark I trench knife.



The scabbards of the French-made knives were blued steel rather than the stamped sheet metal variety issued with the American-made knives

(right, top)
U.S. M1918 Mark I trench knife.

(right, bottom)
A French-made M1918 Mark I trench knife. Note the difference in the configuration of the scabbards.

Reconstructed and computer enhanced Second World War photograph of father and son members of the Army's 506th Parachute Infantry Regiment at Ft. Benning, GA. Both paratroopers have the WWI-manufactured M1918 Mark I trench knife. Although an out-dated design by the time of the Second World War, the M1918 Mark I was the only trench knife in the Army's inventory at the beginning of the conflict. It was issued in fairly large numbers to airborne and other specialized troops.

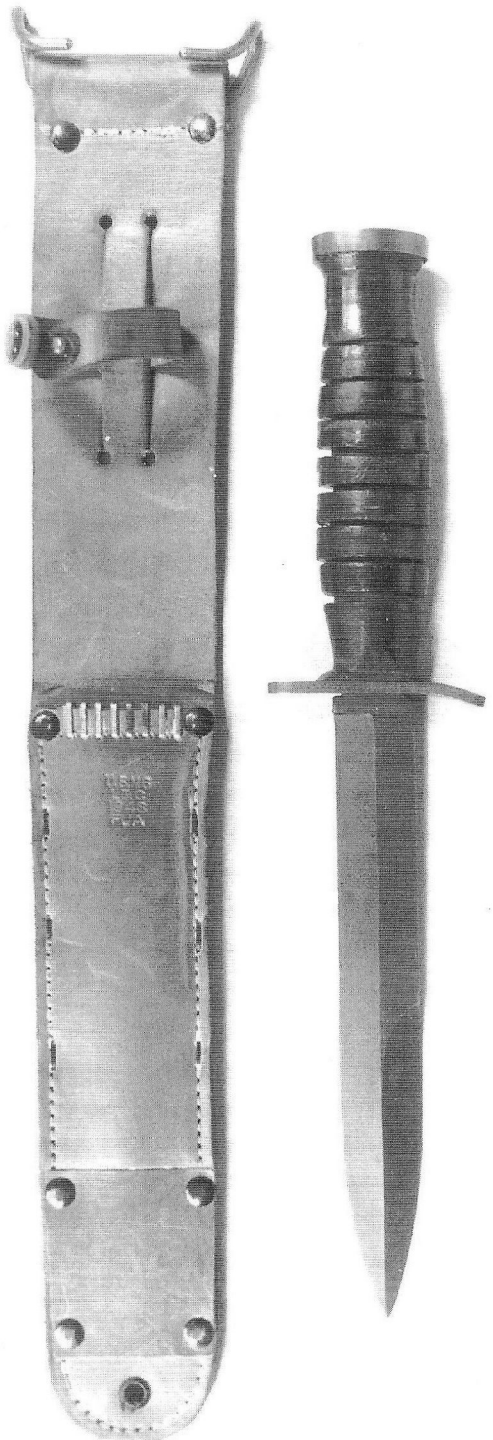
(U.S. Airborne Forces, Europe, 1942-45)

combat. Another factor which weighed heavily against the re-standardization of the M1918 Mark I was the fact that it required a great deal of brass which was an item in critically short supply in 1942. Brief consideration was later given to adopting the Navy's standard Mark 2 ("Kabar") knife but this was not done. However, while the Army did not officially adopt the Mark 2 knife, some were procured and issued by the Army.

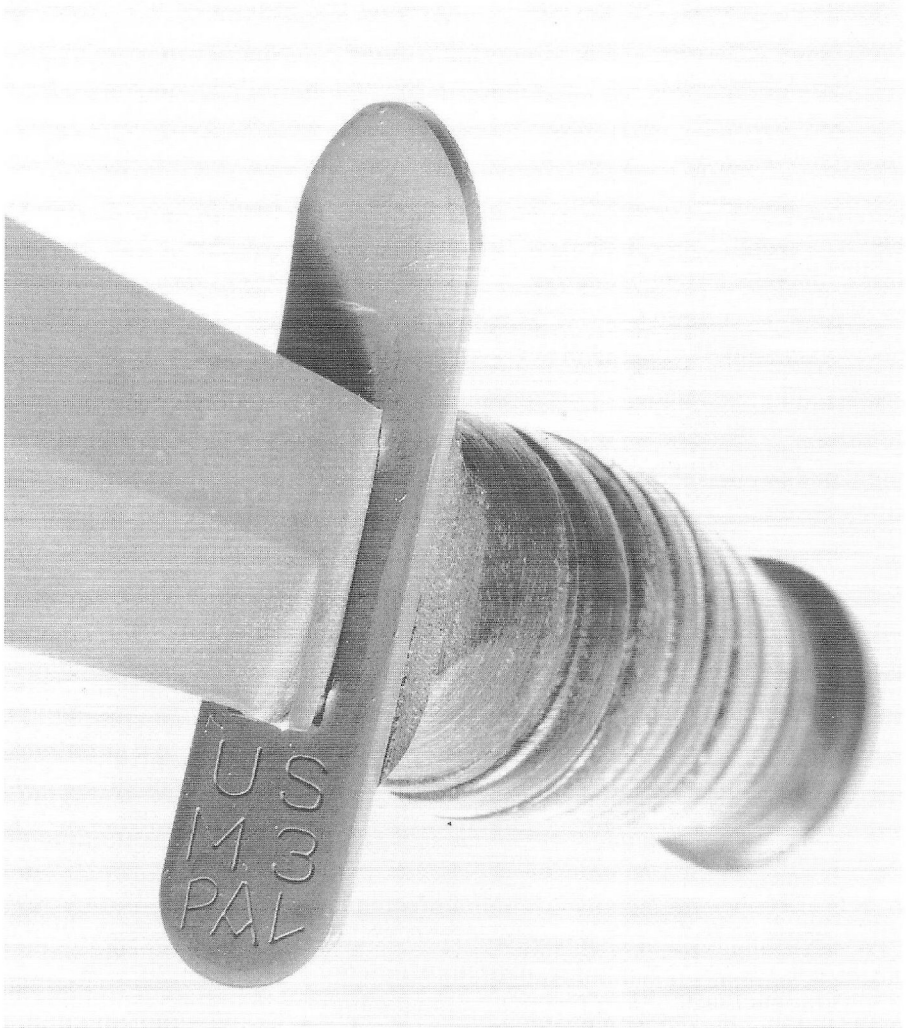
M3 Trench Knife

The Ordnance Department issued specifications in December of 1942 for a sturdy combat knife having a 6¾" dagger blade and a grooved leather handle with a steel pommel. After extensive testing, the new knife was standardized on January 14, 1943 as the "Trench Knife, M3". It is interesting to note that the trench knife designation was still used for a weapon adopted in the middle of the Second World War. The M3 was designed to be a strong and rugged knife yet capable of being efficiently mass produced.

Six commercial firms were initially given contracts for production of the M3 trench knife and a total of nine companies eventually manufactured the weapon during World War Two. The first batch of 3,005 M3 trench knives was produced in March of 1943. In



M3 trench knife with M6 leather scabbard. The M3 was made in large numbers during WWII and widely issued.



Typical markings found on M3 trench knives. This specimen was made by the Pal Blade and Tool Co. Earlier production knives were marked on the blades.

April, the number produced rose to 27,044, and the monthly production had reached 237,525 knives by November of 1943. A total of 2,590,247 M3 trench knives had been made by the time production stopped in August of 1944.

The M3 trench knife was originally issued with the M6 scabbard. This scabbard was developed in early 1943 (Ordnance Department Drawing dated January 2) and was made of leather with a metal reinforcing plate. The M6 had belt hooks which allowed it to be attached to the pistol belt or the cartridge belt. Six different firms produced the M6 scabbard in 1943.

The M3 trench knife proved to be immediately popular with the troops and the weapon was designated as a Critical Item in July of 1943 in order to expedite its production. By February of 1944, the demand for the M3 knife was beginning to be met and the monthly production rate was decreased to approximately 90,000 knives. However, an unexpected sharp increase in demand resulted in the M3 trench knife again being placed on the critical item list in April of 1944. Production was increased and by May and June of 1944 the monthly rate of production reached approximately 200,000 knives.

The adoption of the M4 Bayonet-Knife in April of 1944 resulted in a reexamination of the need for sustained production of the M3 trench knife, since the two weapons were essentially identical in form and utility. When mass production of the M4 Bayonet-Knife started in August of 1944, plans were formulated to substitute it for the M3 trench knife. However, production of the M3 was not immediately halted. An Ordnance Department report stated that

...because of the critical shortage of trench knives existing, instructions were issued to continue full production of the M3 Trench Knives until such time as the change-over to the Bayonet-Knife could be effected, which should not be later than 15 July, 1944.

Since regulations called for every soldier armed with a carbine to be issued a trench knife, the M4 was obviously preferred since it could function as both a bayonet and a trench knife. In August of 1944, manufacture of the M3 trench knife ceased and production shifted to the M4 Bayonet-Knife.

The leather M6 scabbard proved to be prone to deterioration and was too weak for prolonged use. The M6 was replaced by the plastic M8 scabbard which was similar to the M7 bayonet scabbard. GIs devised several ways to carry their M3 trench knives. Many hooked the knives to their pistol belts or cartridge belts in the conventional manner and, occasionally, the knife was tucked behind the .45 pistol holster. Another popular mode of carrying the M3 is revealed in numerous World War Two vintage photographs which depict the knives in M6 or M8 scabbards strapped to the boots of paratroopers. So carried, the M3 trench knife would be instantly available to cut shroud lines or employed as a weapon.

The M3 trench knife saw widespread service from mid-1943 through the end of the war. It was very popular with most of its users and was widely used by paratroopers, Rangers and many infantry personnel. An Ordnance Department report commented on the trench knife's (and bayonet's) effectiveness during World War Two.

Official records definitely establish that, in numerous instances, lives of service men were saved by reason of being armed with bayonets and trench knives.... In combat theaters where terrain, weather or other conditions were favorable for enemy infiltration, it has been found that the bayonet and trench knife were the weapons most commonly used for disposing of enemy personnel.

The report went on to conclude that "Experience has proven the possession of a trench knife was a great morale booster for the individual fighting man."

The M3 trench knife was one of the classic weapons of the Second World War. It was an effective weapon as well as a reliable tool for the infantryman. Its basic design was used in the M4 Bayonet-Knife as well as the post-WWII M5 and M5A1 bayonets used with the M1 rifle, the M14's M6 bayonet and the M16's M7 bayonet. This longevity speaks well of the soundness of the M3's original design. If an individual desired one representative example of a U.S. combat knife of World War Two, the M3 would be an excellent choice.

Close-up enlargement of an M3 trench knife strapped to the right boot of a GI in the European Theater, Winter of 1944-45. (U.S. Army)

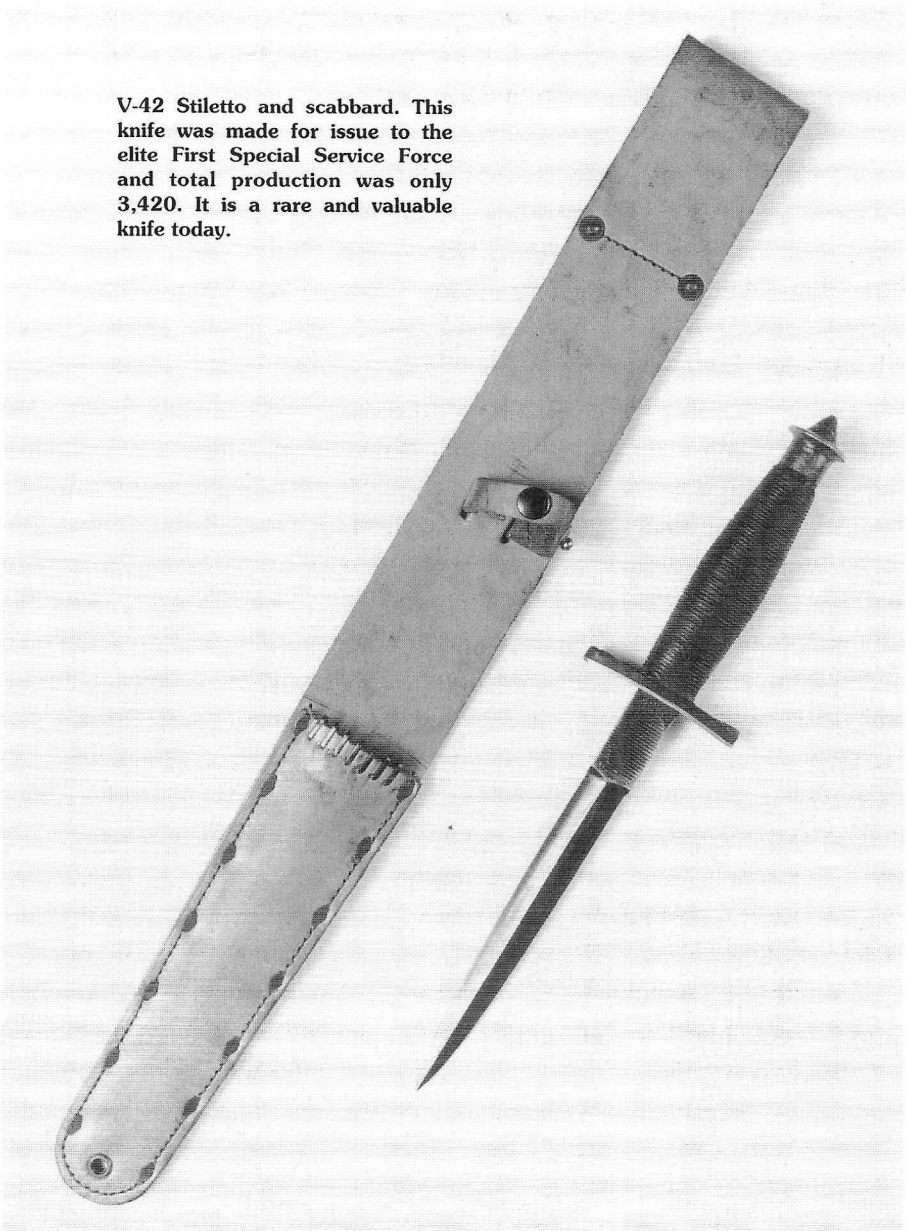
1st Special Service Force personnel near Anzio, Italy. The "Forceman" at center is opening a package with his Case V-42 stiletto. The V-42 was issued only to members of the unit and are rare and valuable items today. (Allied Military Fighting Knives)

V-42 Stiletto

While the production of the M3 trench knife numbered in the millions and was widely used in the war, another Army combat knife was produced in extremely limited numbers and issued only to an elite unit.

The First Special Service Force was a joint American-Canadian unit which was formed in the summer of 1942. The unit was an all-volunteer outfit with extremely high standards and extensive and rigorous training. The original purpose of the Force was to operate behind enemy lines in Northern Europe during the winter. The "Forcemen" (as they called themselves) were trained in airborne operations and ski tactics and were to be equipped with M29 "Weasel" tracked vehicles.

The Forcemen were issued special gear including parkas and other cold weather equipment. The Force also needed a fighting knife and a design by one of their senior officers was sketched and submitted to three cutlery firms. The firm of W.R. Case & Sons was selected to produce the knife which was designated in Ordnance Department documents as "Knife, Fighting, Commando Type, V-42." It is presumed that the "V"



V-42 Stiletto and scabbard. This knife was made for issue to the elite First Special Service Force and total production was only 3,420. It is a rare and valuable knife today.

designated "Victory," and "42" the year the knife was adopted.

The V-42 had a 7 5/16" blued stiletto blade and the overall length was 12 9/16". The handle was made of finely serrated leather washers and the pommel ended in a sharp point for use as a "skull crusher." The knife was marked "CASE" on the ricasso, and a section of the rear blade near the blade shoulder was serrated for use as a thumb rest to help align the blade during a thrust.

The V-42 was essentially a custom-made knife as opposed to the other types of mass-produced military knives that were made in the millions. The interesting story of the V-42 knife as found in the book *Allied Military Fighting Knives* confirms that "...each (V-42) knife was handmade from a single pattern and that all variations in blade length, degree of bend on the crossguard, number of grooves on the 'thumbprint' and the length of the ricasso were the result of the individual craftsman who made the particular knife."

The knife was issued with a leather scabbard about 20" in length. The reason for the length was so the knife would hang below the long parkas and be instantly available. Other than the extended belt attachment portion, the V-42's scabbard was very similar to the M6 scabbard later used with the M3 trench knife.

The V-42 was arguably one of the most attractive combat knives of the war and was a very effective weapon in trained hands. The relatively thin stiletto blade which made it such an effective fighting weapon did not lend itself to use as a tool or camp implement as was generally done with most other military knives.

The first recorded order for the V-42 knife is found in War Department Q.M.C. Form #481 dated November 27, 1942, which confirmed that 1,750 of the knives were shipped in 10 boxes. A subsequent document confirms that this initial order was received and inspected on 10 December, 1942 and forwarded to the "Ordnance Property Office, 1st Special Service Force, Fort William Henry Harrison, Helena, Montana." Ordnance Department records reflect official delivery to the Army of this batch of 1,750 V-42 knives in January of 1943. Further deliveries in 1943 included an additional 70 knives in February, 600 in June, 100 in October and 900 in November for a total of 3,420. No further V-42 knives were delivered to the Army after November of 1943.

It has been reported that some V-42 knives were issued with USMC Raider stiletto scabbards to members of the Light Cruiser Omaha's Landing Force. The fact that a few of these knives were procured by the Navy is confirmed in the Case Company's shipping records which indicate that some 70 V-42 knives were

sent to the Brooklyn Navy Depot in late 1942 and early 1943. However, except for this handful of V-42 knives acquired by the Navy, the balance of production was slated for the Army's elite First Special Service Force.

The original winter warfare mission of the First Special Service Force was cancelled and the unit was deployed to Italy. In the Italian campaign, the Force was utilized in Anzio and other battles as "shock troops" and often operated behind German lines. Their V-42 knives were used with great effectiveness in many instances. The Force was among the first troops to enter Rome in June of 1944. The members of the First Special Service Force took a great deal of pride in their V-42 knives as one of the symbols of an elite unit as well as a deadly weapon in its own right.

When the First Special Service Force was disbanded in France in late 1944, approximately 350 V-42 knives are reported to have been turned in. The remaining 3,000+ knives were not accounted for. Undoubtedly a number really were lost in combat, but many others "mysteriously" disappeared and were not turned in. It is reported in the book *Allied Military Fighting Knives* that "...many of the men sent their knives home prior to going into action — to avoid damaging or losing them!"

Although the V-42's issue and use was generally restricted to a relatively small and elite unit and was not a large part of the infantry arsenal of World War Two, its contribution to the war effort should not be overlooked. The V-42 knife served equally well as a deadly weapon and as a symbol of this elite unit. The spirit of the First Special Service Force lives on in the U.S. Army's Special Forces units today. Fittingly, the V-42 knife is part of the Special Forces' crest on their shoulder patch.

U.S. Marine Corps Combat Knives

As was often the case, the requirements of the Army took precedence over the needs of the Marine Corps, particularly in wartime. Upon the outbreak of WWII, the Marine Corps, like the Army, had no "modern" combat knives in inventory. Reportedly, the Marines had a few of the M1918 Mark I knuckle knives but no standard issue combat knife was available. Several types of commercial sheath knives were procured and issued on a random basis but a standardized combat knife was clearly needed.

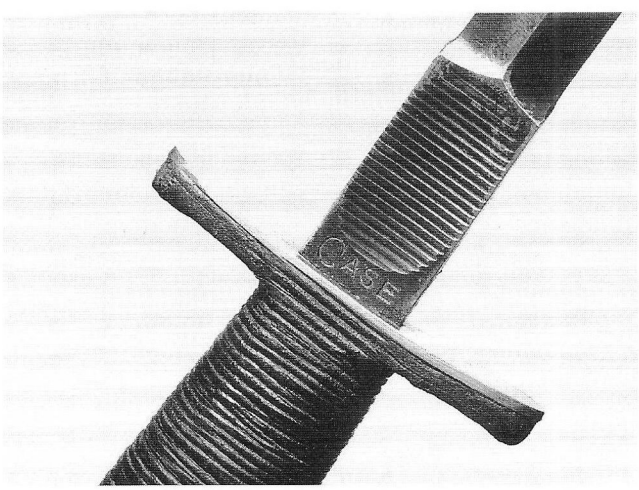
Mark 2 ("Kabar")

A design was finalized in late 1942 for a "Fighting & Utility Knife." The knife was approved for procurement by the Commandant of the Marine Corps in late 1942. After brief preliminary testing, the knife was standardized by the U.S. Navy as the Mark 2. The first shipment of these knives to the Marines in the South Pacific was on January 27, 1943.

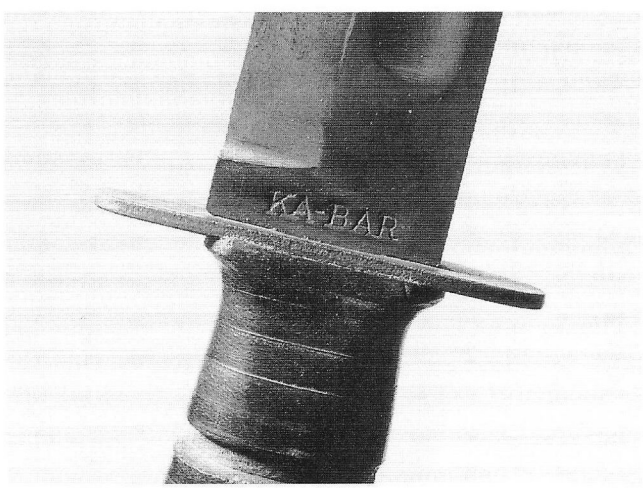
The Mark 2 had a 7" blade and was about 12" in total length. The handle was constructed of grooved leather washers and the knife had a heavy metal pommel. The heavy pommel allowed the knife to be used as a hammer if necessary and the added weight enabled it to be wielded as a light machete. Most Mark 2 blades were parkerized but some were blued.

The original Mark 2 design proved to have some weak points, and the knife was redesigned by the Camillus Cutlery Company to overcome these problems.

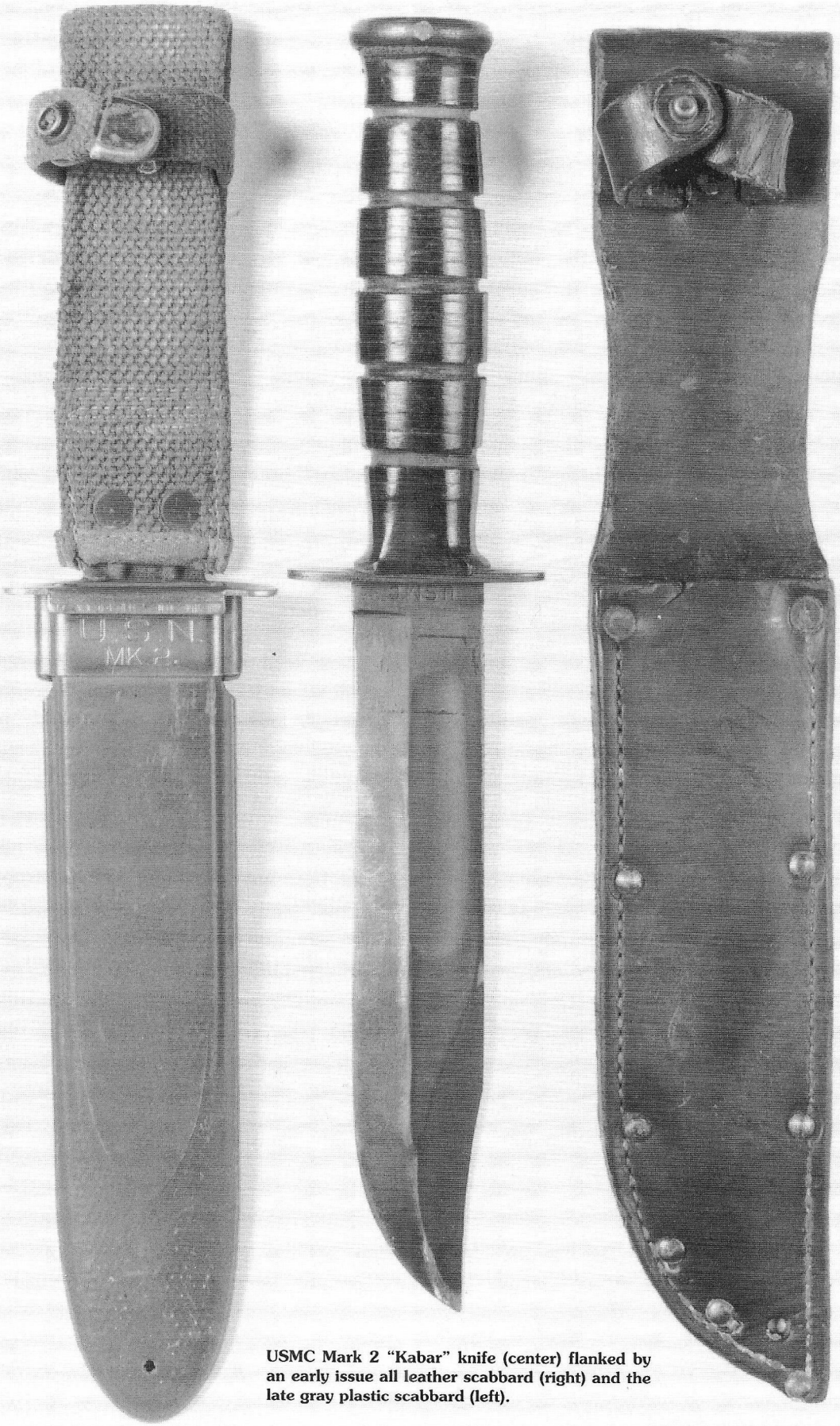
A number of different firms produced the Mark 2 knife for both the Navy and Marine Corps during World War Two. Some variations will be noted between knives made by the different contractors. As would be expected, the knives manufactured specifi-



V-42 blade markings. These knives were made by W.R. Case and Sons Cutlery Co. Note the "thumbprint."



"KA-BAR" markings on USMC Mark 2 knife.



USMC Mark 2 "Kabar" knife (center) flanked by an early issue all leather scabbard (right) and the late gray plastic scabbard (left).

Marines treating a casualty. Note the "KaBar" knife on the Marine at left. (USMC)

cally under Navy contract were marked "USN" on the ricasso and the Marine Corps knives "USMC". The largest number of these knives produced under Marine Corps contract was made by the Union Cutlery Company of Olean, New York, which produced approximately one million. These knives were marked with the firm's trademark name "KA-BAR". This name quickly caught on with the Marines and the knives became universally known as "Kabars," regardless of the actual maker.

An all leather scabbard with a belt loop was issued with the Navy and Marine Corps Mark 2 knives. Some of these scabbards were marked "USN" or "USMC" and a few were also stamped with the name of the manufacturer and the date of production. The leather scabbard was prone to deterioration in the Pacific climes and a gray plastic scabbard with a canvas belt loop was eventually adopted to alleviate this problem. The scabbards were marked "U.S.N. Mk. 2" on the metal throat.

As evident in its "fighting & utility" nomenclature, the Mark 2 was intended as a compromise weapon. From a practical standpoint, the design was not as effective as the V-42 or even the M3 trench knife as purely a fighting knife. On the other hand, it was adequate in such a role and was much more useful as a tool. When necessary, the Kabar could give a credible account of itself in hand-to-hand fighting.

Issue of the Kabars began in early 1943 and the knife soon proved to be very popular with the Marines. The knives were widely used in the middle and latter stages of the war in the Pacific and many Marine veterans today fondly remember their old Kabars. Although not officially adopted by the U.S. Army in World War Two, some Kabars were issued to Army personnel.

As a military knife, the Kabar is among the best due to its wide range of uses. An infantryman cannot be burdened with a number of special purposes knives and a design such as the Mark 2 that can be used almost equally well as either a weapon or a tool is ideal. A passage in the book *Our Kind of War* fittingly sums up the excellence of the Kabar.

Probably no other military knife has been in production and continued use for such a prolonged and continuous time. This in itself speaks highly of the effectiveness of the original design. Made by many different companies for Marine Corps contracts, it served in World War II, Korea and Viet Nam. It still is standard issue to the U.S. Marines.

U.S. Marine Raider Stiletto

While the Kabar was produced in the millions and was widely issued during World War Two, another type of Marine Corps fighting knife was made in very limited numbers and saw equally limited issuance.

Just weeks before America's entry into the Second World War, the Marine Corps decided to form a special unit based on the British Commandos who had already earned an enviable reputation in the war. In November of 1941, two Marine observers were sent to Great Britain to train with the Commandos and pick up ideas useful in forming similar units for the Corps.

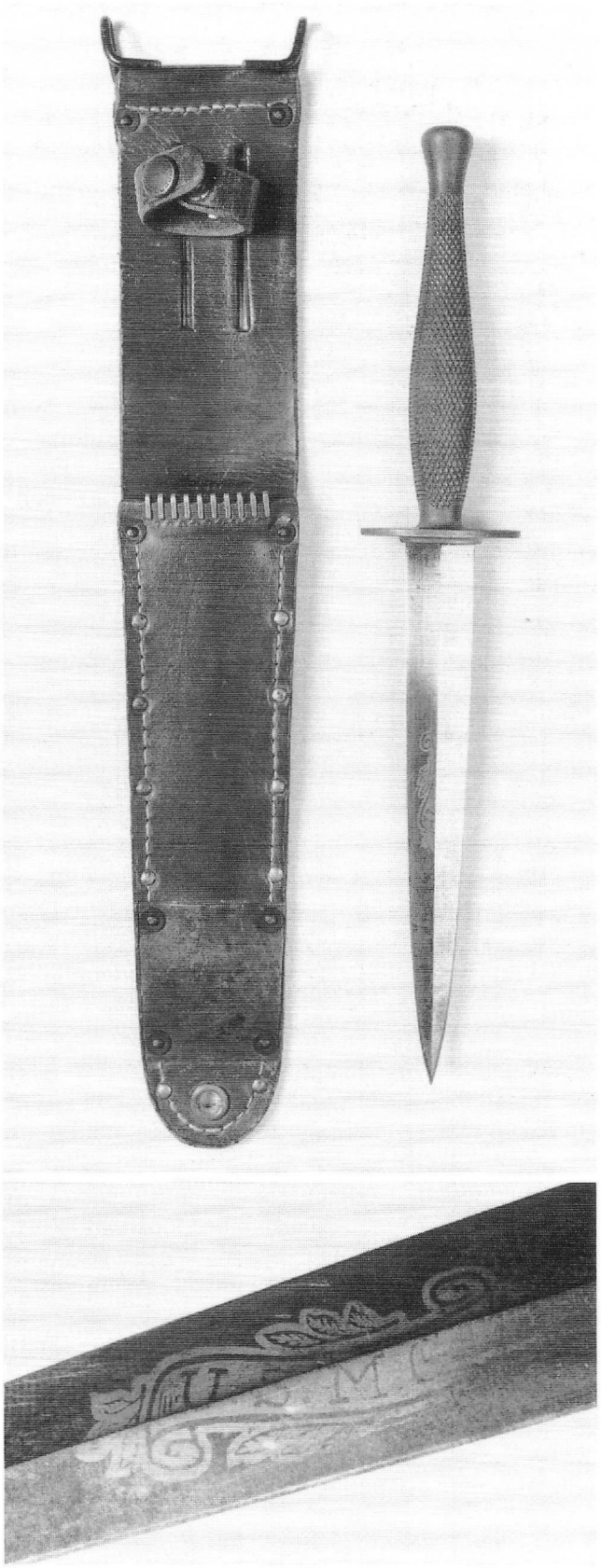
In February of 1942, the Marine Raiders were formed and eventually two battalions were established. Only volunteers were accepted for duty with the Raiders and these Marines were subjected to a strict screening process and extremely rigorous training that eliminated many men. Those who completed the training and were accepted into the Raiders were highly trained and motivated elite troops.

As would be expected, the Raiders required a combat knife appropriate for their required duties. The Mark 2 had not yet been adopted, and no suitable knives were in the Navy's or Marines' inventories. Since the Raiders were, in part, organized on the order of the British Commandos, it was logical to equip them with similar weapons. The Commandos used the famous Fairbairn-Sykes (F-S) knife, which was a deadly stiletto designed solely for silent and efficient killing. A knife based on the British F-S design was manufactured for the Raiders by the Camillus Cutlery Company of Camillus, New York. Sources indicate that a total of 14,370 Raider stilettos were delivered by Camillus to the Marine Corps during World War Two. It has been reported that the Raider stilettos were also issued to some members of the First Marine Division Scout groups and to the First Marine Parachute Battalion.

The Marine Raider knife had a double edged 7¼" tapered blade with a sharp stiletto point. The knife was 12¼" long overall. The hilt was constructed of zinc-aluminum alloy and was die-cast directly onto the blade tang. Checkered gripping panels were cast into the handle. The bright-finished blade had a scroll with "USMC" lightly etched on above the maker's name and address.

The Marine Raider stiletto was issued with a leather scabbard with cartridge belt hooks. The scabbard was very similar to the M6 scabbard used with the M3 trench knife. Several minor variants of the Marine Raider stiletto scabbard have been noted.

While better for its intended purpose than most other knives, the Marine Raider stiletto had little utility



USMC Stiletto. This knife was patterned after the Fairbairn-Sykes "Commando Knife." The knife was issued mainly to Marine Raider units during World War II. The blade detail at bottom shows the etched "USMC" marking, which was lightly applied and wore off very easily.

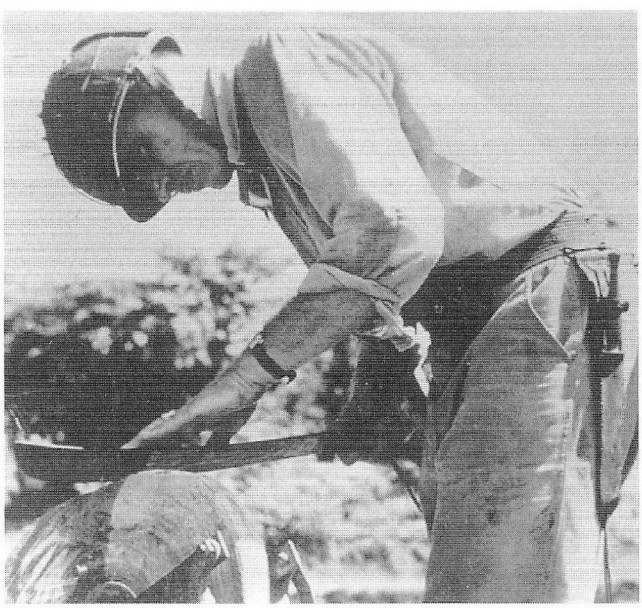
as an all-around military knife. As correctly stated in the book *Allied Military Fighting Knives*,

...the Stiletto was not designed to be used for opening ration cans or as a pry bar to open cases. After all, the knife was designed for one purpose — killing the enemy — and its design was not compromised to also include a variety of other uses normally associated with a machete or a utility knife. No, the Stiletto was a finely designed — almost delicate — single purpose weapon.

Many knives had their tips, if not the entire blade, broken from careless use. In addition, over the years it has been discovered that the alloy handle and cross guard on these knives were prone to deteriorate and over half of the surviving specimens have damage ranging from cracking to entire sections broken off.

Due to its limited utility and rather fragile construction, the use of the Stiletto was not widespread. Many Raiders exchanged their Stilettos for Kabars when they became available. Surviving specimens are quite uncommon and are usually very expensive. It is interesting to note that such knives are much rarer and more valuable than many of the highly prized Japanese Samauri swords brought home after the war.

The Marine Raider Stiletto has much in common with the V-42. Both knives were designed for and issued to special elite units and were intended strictly for deadly use in close quarter combat by highly trained troops. The knives were highly prized weapons and are seldom seen on the market today.



A Marine Raider on Samoa, 1942, sharpening his machete on a grinding wheel. Note the USMC Camillus stiletto on his pistol belt. This knife was produced in limited numbers during World War II for issue to the Raiders. (Our Kind of War)

V-44 "Gung Ho" knife with tooled leather sheath. This is the variant with the green horn handle as adopted by "Carlsons' Raiders" in World War II.

V-44 "Gung Ho" Knife

Another little-known Marine combat knife of World War Two is the so-called "Gung Ho" knife. This weapon was selected by the 2nd Raider Battalion ("Carlson's Raiders") for issue to their unit. The Gung Ho knife was actually a standard Collins Type 2, V-44 Survival Knife. The Collins Company referred to this knife as their No. 18 model. The V-44 knife had a 9½" bright finished blade and was a strong and durable weapon. Early in World War Two, the Collins knife was acquired by the military for use in aircraft survival kits. The attributes that made it a good survival tool

attracted the interest of the Raiders who were looking for a knife to meet their particular needs.

The 2nd Raider Battalion purchased 1,000 of these knives in September of 1942 when the unit was at Camp Catlin, Hawaii, re-equipping after the Midway and Makin Island campaigns. The unit marked their knives with serial numbers ("1" to "1000"). Most of the V-44 knives acquired by the 2nd Raiders had green horn handles but a few had black plastic grips. A former Raider, R.G. "Rudy" Rosenquist, remarked that "There were several of the black-hilted knives in our group. We found these had slightly larger handles which didn't tire your hand after prolonged use like the green horn issue did."

The Collins knife was issued with a sheath constructed of a flimsy grade of leather which did not prove to be very durable.

Other Raider units acquired a number of V-44 knives as well. Unlike the 2nd Battalion weapons, these knives are not believed to have been serially numbered. Both green horn and black plastic grips will be found on these knives, although these latter are more commonly seen.

The V-44 knife soon became a favorite with the Raiders. As reported by Rosenquist, "..They were absolutely the greatest tool and weapon we possessed." He went on to say that "The knife was used during the entire (Guadalcanal) campaign for opening ration cans and coconuts, building shelters, cutting fire lanes, etc. It was handy as a small hatchet for cutting small trees and coconut log bunkers. Anyone who has used this knife finds it hard to understand why it is not an item of equipment for today's military personnel."

Although the Raider Stiletto and the V-44 Gung Ho knives were totally different in design and function, both served their intended purposes well and are little known but historically significant weapons.

Standard Collins V-44 knives are relatively common today but the Raider knives, particularly the serially numbered 2nd Battalion knives, are hard to find and are highly prized collectibles.

(above) Blade markings found on V-44 "Gung Ho" knife.

(left) Marine Raider Capt. James Davis planning strategy after the Makin raid. He is wearing the V-44 "Gung Ho" knife issued to the Raiders. (Our Kind of War)

Other Edged Weapons

As stated, numerous other types of knives and edged weapons were used by the Army and Marine Corps during World War Two. Since most of these were not intended for combat use (although some of them were so employed on occasion), they will not be detailed in this book. However, in order to have a more complete picture of the military edged weaponry of World War Two, brief mention is made of a number of these items.

GI in Europe, 1944-45, carrying an M9A1 bazooka. Be sure to notice the commercial sheath knife on his belt. (U.S. Army)

Knives

U.S.N. Mark 1

The U.S. Navy procured very large numbers of a rather small and lightweight sheath knife standardized as the Mark 1. The Mark 1 was produced by many different companies and numerous differences will be evident in these knives. The Mark 1 had a blade length of approximately 5.1" and was generally issued with a gray plastic scabbard.

Western Stiletto

When the Marine Raiders were first formed, no knives were available for training and other purposes. Some commercial hunting knives manufactured by the Western States Cutlery & Mfg. Company were purchased while the Raiders were initially training in California. While the knife was referred to as a stiletto, it was actually a conventional type of hunting knife. Although the Western knife was never standardized by the Marine Corps or the Navy and was replaced when the Camillus Stilettos, V-44s and Kabars became available, a few remained in Raider hands when the Marines departed for the Pacific.

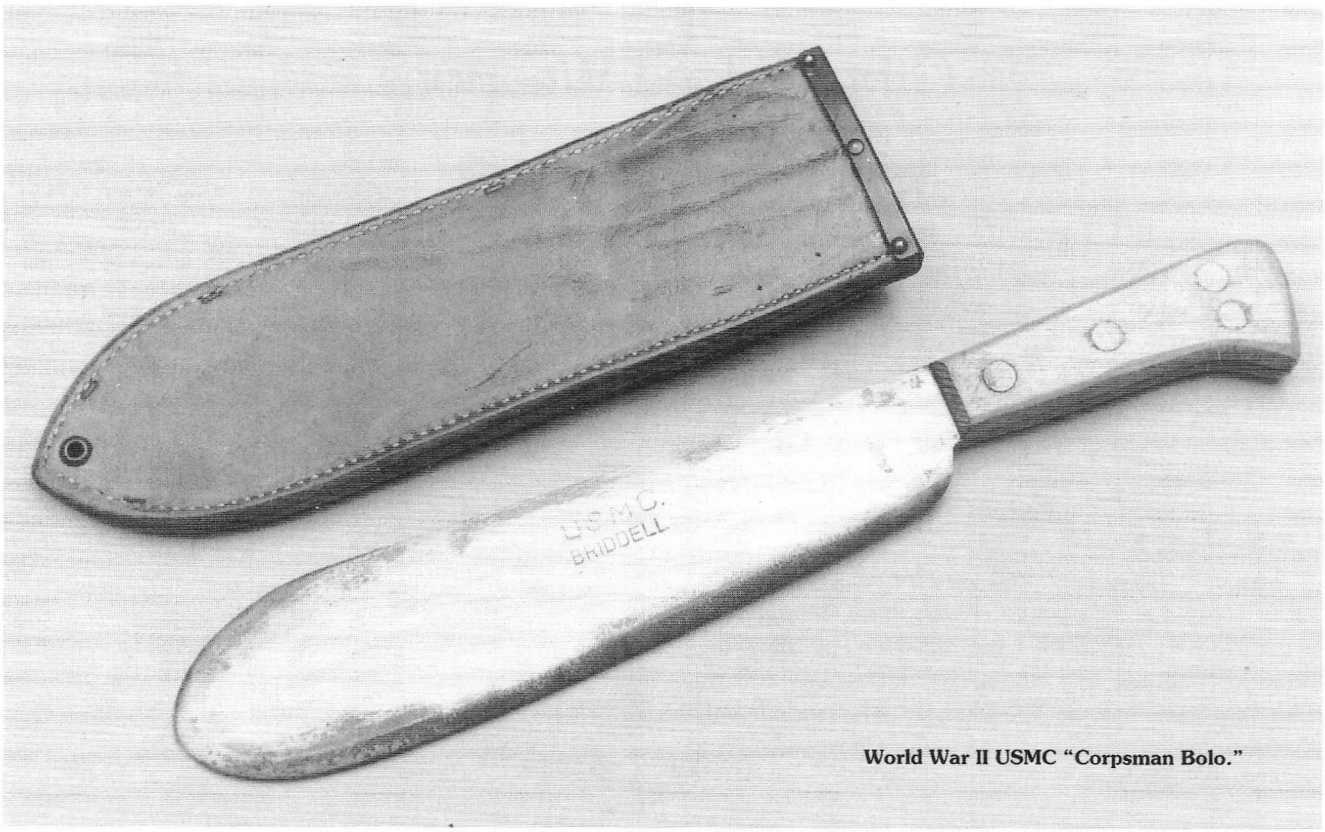
Commercial Knives

Scores of large and small cutlery and knife firms provided all sort of knives to American servicemen during the war. These knives were generally purchased in PXs or while on leave, and many were bought by family members and sent to the servicemen overseas. Virtually any type of commercial knife made prior to 1945 could have seen service during the war, but none of these weapons were acquired under government contract or officially standardized by any branch of the armed forces. Nevertheless, many soldiers, sailors and Marines cherished their personal knives and found a variety of uses for them.

A number of massive knives with brass knuckle handles were produced in Australia during 1942 and 1943 for sale to U.S. servicemen. Some writers have erroneously identified these as being issued to the Army's First Ranger Battalion. However, some of these knives were, in fact, used in combat by American troops in the Pacific. These commercially Australian made brass knuckle combat knives are valued by collectors. However, caution should be exercised as a number of fakes are around.

U.S.M.C. Medical Corpsman Knife

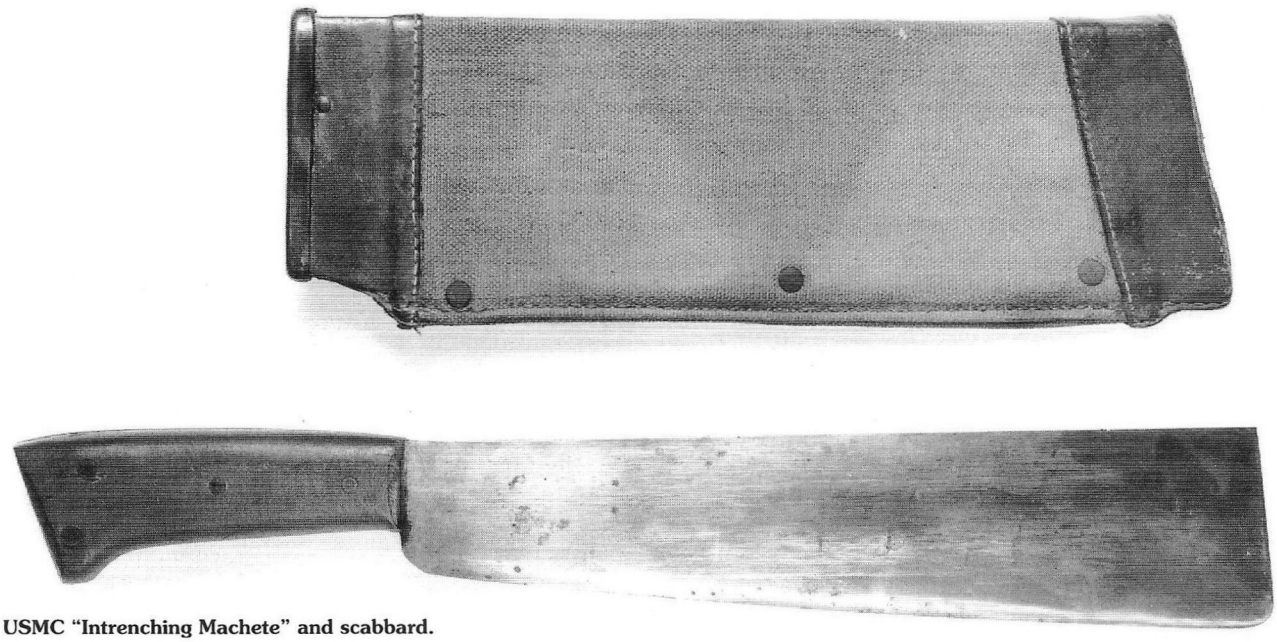
Another type of knife which was not designed or intended for combat use was the Marines' Medical Corpsman's knife. This bolo-type knife had a massive rounded-tip blade just over 11" long. Most of the blades were bright finished but some were parkerized. The blades were generally stamped with a prominent "U.S.M.C." and marked with the name of the maker. The knife was issued with a heavy leather scabbard.



World War II USMC "Corpsman Bolo."

Combat photo of Marines embarking for the beach at Tarawa (November, 1943). The two Marines visible in this view have USMC bolos attached to their packs. Although intended for issue to medical Corpsmen, a number of these bolos were used in combat situations.

(National Archives)



USMC "Intrenching Machete" and scabbard.

The Corpsman's knife was intended to be used as a general purpose tool for medical personnel in the field although it has been reported that some were pilfered by combat Marines.

Machetes

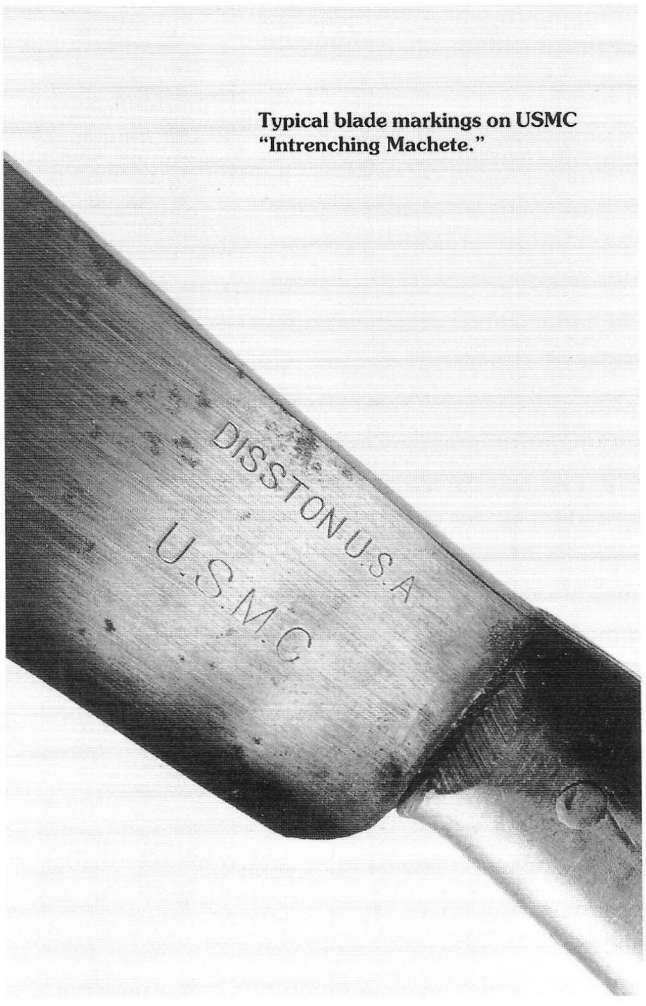
Machetes were a special type of knife generally used to cut through thick underbrush. Numerous varieties of machetes were procured during World War Two.

U.S.M.C. Intrenching Machete

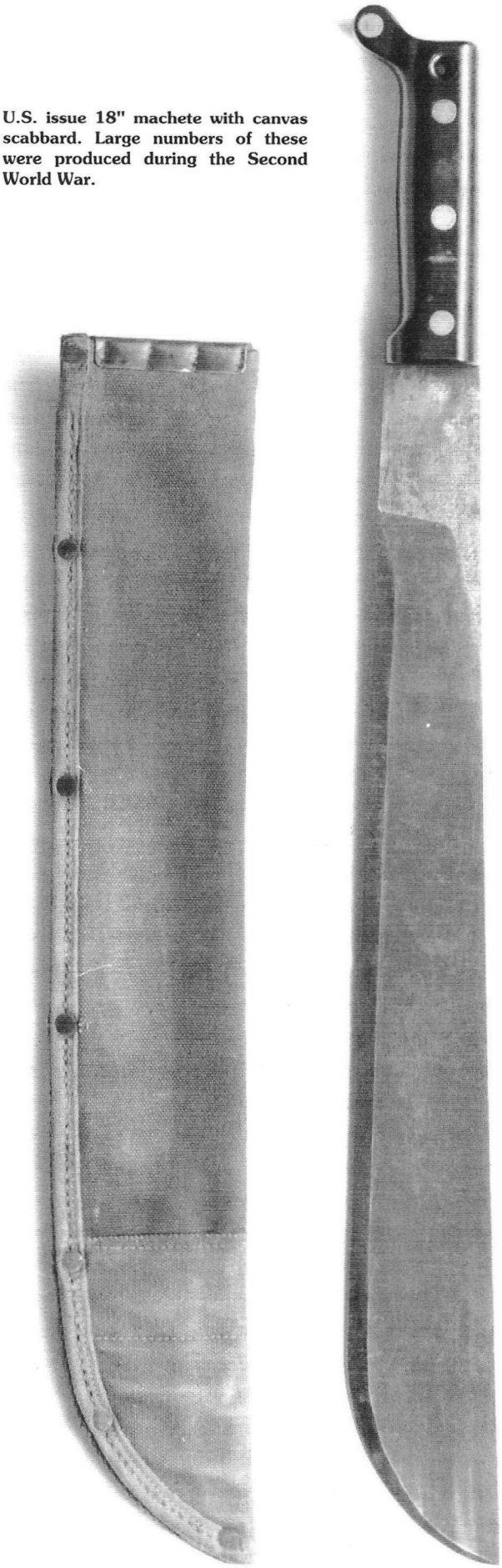
One of the lesser known type of machetes which saw service during World War Two was the "Machete, Intrenching, with Scabbard" as described in the 1938 edition of the *Landing Force Manual.* This knife had a bright finished heavy 11½" blade and was approximately 17" long overall. The knife had a blunt tip and was marked "U.S.M.C." on the blade. It was issued with a canvas covered scabbard with a brown leather tip. The knife was made by two different firms (Collins and Disston) and is not often seen today.

U.S.N. Mark 1 Machete

The Mark 1 machete used by the Navy and Marine Corps had a light 26" bright finished blade and was about 29¼" overall. The grips were made of black plastic. The Mark 1 was issued with a green canvas scabbard.



Typical blade markings on USMC "Intrenching Machete."



U.S. issue 18" machete with canvas scabbard. Large numbers of these were produced during the Second World War.

U.S.N. Mark 2 Machete

The Mark 2 was quite similar to the Mark 1 but had a shorter 22" blade. Its construction and general configuration was otherwise virtually identical.

These machetes were made by a number of different companies and the date of production as well as the maker were stamped on the blade. Most of the blades were bright finished but some Mark 2 machetes had darkened blades.

Many of the machetes produced early in the war were delivered with leather scabbards, but these were soon replaced by canvas scabbards that were more durable, particularly in the Pacific.

U.S. 18" Machete

Large numbers of machetes were delivered to the Army and Marines that had shorter blades than the U.S.N. Mark 1 and Mark 2 machetes. These knives were made with blackened 18" blades which did not have the noticeable curve of the Navy machetes. The black plastic handle was very similar to those used with the Navy machetes. This machete was issued with a green canvas scabbard having cartridge belt hooks.

The 18" machete is not known to have had a standardization or Model designation, but large numbers of these knives were manufactured and issued. Many such machetes were packed in aircraft survival kits. The 18" machete was also an item of issue to some Army airborne troops during World War Two.

Typical blade markings on U.S. issue 18" machete.

While, as stated, the machetes and similar types of knives were not intended as combat weapons, some were so employed either through necessity or preference. A gruesomely illustrative example of how a machete could be used as a weapon is related in the book *Guadalcanal: Starvation Island.*

...Cpl. Dean Wilson's BAR jammed just as three Japanese loomed out of the darkness and charged his foxhole. He threw aside the useless automatic rifle and grabbed for the nearest weapon, a machete, with which he took a swipe at the nearest attacker. The man reached for his belly, but too late to hold back the torrent of intestines that cascaded over his feet. Wilson also hacked the other two Japanese to death.

It would seem that one would have a difficult time convincing Cpl. Wilson that a machete was not an effective combat weapon!

While many persons may overlook the many types of edged weapons when considering the infantry weapons of World War Two, these items played an important supporting role. Although the average infantryman had little occasion to fix bayonets and charge the enemy or stealthily take out a sentry with a stiletto, he nevertheless used his bayonet or trench knife almost daily to open ration cans and to perform other mundane but important chores. However, when the chips were down and no other weapon was available, the bayonet or knife was invaluable and worth its proverbial weight in gold.

Collector Notes

After the end of World War Two until the late 1960s or early 1970s, very little interest was shown in collecting the knives and bayonets of the war. However, within the past 15 or 20 years, this field has become extremely popular with many collectors. Once commonly found and inexpensive items are now quite scarce and very costly.

BAYONETS

M1905 Bayonet

M1905 bayonets are still around today in reasonable numbers but excellent examples are getting to be increasingly harder to find as well as more expensive. The World War One and earlier bayonets are not difficult to find but most have been arsenal rebuilt and have parkerized blades and other modifications (such as plastic grips). The M1905 bayonets made by Springfield Armory (SA) and Rock Island Arsenal (RIA) were all made prior to World War Two.

The later WWII-manufactured M1905 bayonets are easy to identify as they are marked with the date of production (1942) and the name of the manufacturer. All will have parkerized blades and plastic grips.

The arsenal rebuilt SA and RIA M1905 bayonets generally sell for about the same as the original WWII-made variety given comparable condition. The unmodified pre-WWI armory made bayonets with bright blades and other original features are harder to find and more expensive than the rebuilt or WWII-made bayonets.

Scabbards for the M1905 bayonets have recently become much more difficult to locate. The only variety easily found at reasonable prices today is the plastic World War Two M3 variety. The earlier leather M1905 or M1905 Modified scabbards or the canvas M1910 scabbards are much tougher to find. The M1910 is particularly in demand today as it is "correct" for the bayonets of both wars and clean specimens are not easily found.

The M1905 bayonet is an important weapon as it was the standard issue for both the M1903 and M1 rifles at the beginning of World War Two. While some collectors prefer to have WWII-manufactured bayonets on their WWII rifles, this is not really necessary. Any World War One or earlier vintage M1905 bayonet (particularly rebuilt examples) are correct and proper for any Second World War '03 or Garand. Likewise, the leather M1905 Modified scabbard or web M1910 could properly be displayed with either type of rifle as could the plastic M3 scabbard.

M1 Bayonet

The M1 bayonet is still around in fairly large numbers today, and a collector shouldn't have much of a problem finding a decent example at a good price. The original M1 bayonets and the shortened M1905 variety are about equal in price and desirability. Both would be equally appropriate for use on a World War Two M1903 or M1 rifle. Since the M1 actually saw more use in the war than the M1905 bayonet, many collectors prefer it for display on their '03s and Garands. Both types of bayonets would be correct although the M1 bayonet would be more typically found on rifles in service after 1943 than would the M1905 type.

Like the M1 bayonet, the plastic M7 scabbards are still around in large numbers today and finding a good example should not be difficult.

M1917 Bayonet

As stated, all M1917 bayonets were made in 1917 and 1918 by either Remington or Winchester. None were made during World War Two as the supply on hand was sufficient to meet the demand.

Unlike the M1905 bayonets, relatively few of the M1917 bayonets were arsenal rebuilt. The rebuilt M1917 bayonets can be identified since the parkerizing is a lighter shade than the original finish and the markings may be a bit indistinct.

Most of the M1917 bayonets used in World War Two retained their original green leather World War One scabbards. The plastic M1917 scabbard came into use very late in the Second World War and few were issued.

The M1917 bayonet would be correctly displayed on a M1917 Enfield rifle remaining in service during World War Two or on any of the U.S. military trench guns (12-gauge shotguns fitted with a ventilated metal hand guard and bayonet adapter).

Although still reasonably available,

excellent examples of M1917 bayonets are becoming increasingly harder to find each year and prices are climbing. The increased collector interest in military shotguns is also having some effect on the supply of M1917 bayonets.

M1941 Johnson Rifle Bayonet

Like the rifle, the M1941 Johnson bayonet is not rare but can be considered somewhat scarce. A collector desiring to acquire an example can usually do so without a great deal of trouble although the price will typically be rather high.

The plain, utilitarian-appearing Johnson rifle bayonet is rather crudely made. Most of the bayonets are unmarked although some may be found stamped with a number. The significance of this number is not known as it does not appear to correspond to Johnson rifle serial numbers.

The simple cylindrical-shaped leather sheath seems to be a bit less common than the bayonet because a number of bayonets are missing their sheaths. Some reproduction (i.e., fake) Johnson rifle bayonet sheaths have appeared on the market in the past few years. Many of these are very similar to the original sheaths. The best way to determine if a sheath is original is to compare its overall condition to the bayonet. A sheath which appears to be in new condition obviously shouldn't be found with a well-used bayonet. Since it is possible to artificially age a newly made sheath, the item should be examined in detail.

The Johnson rifle and its bayonet did not play a significant role in World War Two but they are interesting and very collectible weapons.

M4 Bayonet-Knife

The rapid increase in collector interest in M1 carbines over the past couple of decades has resulted in the supply of original World War Two M4 bayonets becoming rapidly depleted. Fifteen or twenty years ago such bayonets were commonly found for just a few dollars. Today, original World War Two M4 bayonets in collectible condition are rather hard to find and are usually rather expensive.

A collector wishing to acquire a specimen of an original World War Two M4 bayonet should be aware that original WWII-production M4 bayonets had grooved leather grips. Some may be found with rubber or wooden grips which are generally post-war rebuilds. Some M4 bayonets produced in the 1960s had plastic grips like the later M6 and M7 bayonets.

A collector may occassionally encounter an M4 bayonet with the blade marked "U.S. M3". These bayonets were assembled during World War Two from left-over M3 trench knife blades and are an uncommon and valuable variation.

The following firms produced M4 bayonets during World War Two: American Cutlery Co. (ACC), Aerial, Camillus, Case, Imperial, Kinfolks, Inc. (KI), Pal and Utica. Several other firms made the M4 bayonet after the war. The name of the maker will be found stamped on the cross guard.

Camillus has recently begun manufacturing newly made M4 bayonets. These items look very much like the original WWII variant and are similarly marked. A collector wishing to purchase an original WWII M4 should examine any Camillus bayonets very closely to determine if they are 1944-1945 vintage or the newly made item. The reproductions are much cheaper than the original WWII bayonets.

The correct type of scabbard for the M4 Bayonet-Knife is either the M8 or the M8A1. The model designation is stamped on the scabbard's metal throat. The chief difference between the two types is that the M8A1 has cartridge belt hooks.

Original World War Two production M4 bayonets are very popular with collectors today and are bound to continue their steady increase in price and decrease in availability.

KNIVES

M1918 Mark 1 Trench Knife

Although none were produced after 1919, examples of the M1918 Mark 1 trench knife are found in a number of World War Two collections due to the use of this weapon in the war. As discussed, the two most common variants are the Landers, Frary & Clark (LF&C) knife and the French-made Au Lion type. The LF&C knife appears to be somewhat more common but prices seem to be comparable given equal condition. The M1918 Mark 1 knives produced in prototype quantities by HD&S (and possibly OCL) are quite rare and much more valuable than the LF&C or Au Lion knives.

When evaluating a Mark 1 knife for collecting purposes, close attention should be paid to the blade to determine if it has been heavily sharpened or otherwise altered. If so, the price should be adjusted downward depending on the degree of sharpening or alteration. As originally issued, the LF&C knives were chemically blackened on the handles and blades. A number of these knives have been observed which have had this blackening removed to dress up the appearance of the knife. Obviously, this would detract from the desirability and value of the weapon for collecting purposes. It should be noted that unlike the LF&C M1918 Mark I knives, neither the blades nor handles of the French-made knives were blackened.

Another thing to look for are the metal prongs on back of the scabbards on both types of Mark 1 knives. These prongs were not very sturdy and many scabbards will be found with one or both missing. Again, this would devalue the scabbard to some degree.

A potential collector should be warned that some fake M1918 Mark 1 knives are around (most are supposedly from England). These can usually be detected by closely examining the workmanship of the handle portion, which is of noticeably lower quality than on the originals. Also, the blades on many of these fakes are a bit wider than the originals, so comparison with a known genuine M1918 Mark 1 knife is recommended if possible. Many commercial reproduction M1918 Mark 1 knives are also around, but these can easily be distinguished from the originals.

M1918 Mark 1 knives are very interesting additions to a World War Two infantry weapon or knife collection because they were used in both World Wars. Decent examples can still be found but are becoming tougher to locate and more expensive as time goes by.

M3 Trench Knife

Probably the most widely collected and most popular combat knife of the Second World War is the M3 trench knife. Despite total production in excess of 2½ million knives, original M3s are surprisingly hard to find and prices reflect this scarcity and desirability.

Some collectors specialize strictly in the numerous variations of M3s, and some impressive collections have been assembled. For collecting purposes, two major variations are recognized; knives with the designation, maker and date stamped on the blade and knives with these markings on the guard. Early production knives were marked on the blade but it was determined that such stamping could possibly weaken the blade and later knives had the markings stamped on the guard instead.

The following, shown at the top of the facing page, is a list of firms which produced the M3 trench knife during World War Two and their reported production totals.

Firms Which Produced The M3 Trench Knife During World War Two And Their Reported Production Totals

1. Aerial Cutlery Co., Marinette, WI 51,784
2. W.R. Case & Sons, Bradford PA 300,465
3. Imperial Knife Co., Providence, RI 854,015
4. Pal Blade & Tool Co., Plattsburg, NY 121,131
5. Camillus Cutlery Co., Camillus, NY 404,109
6. Robeson Cutlery Co., Perry, NY 36,575
7. Kinfolks, Inc., Little Valley, NY 135,548
8. Utica Cutlery Co., Utica, NY .....(Estimated) 655,230
9. H. Boker & Co., New York, NY 31,300

As can be seen, the largest number of M3 trench knives was made by Imperial and the fewest by Boker.

The blade-marked M3 knives bring a premium over the later guard-marked knives.

The M3 trench knife was originally issued with the M6 scabbard. The leather M6 tended to deteriorate with use and the M8 (and later M8A1) plastic scabbard was authorized for use with the M3 trench knife. However, large numbers of M6 scabbards were used in World War Two. Surviving specimens of the M6 are tough to find today and are highly prized by M3 knife collectors. Six different firms produced M6 scabbards during the war.

As is the case with the M4 bayonet, Camillus has started producing newly made replica M3 trench knives. These knives are almost identical to the original World War Two knives and are also similarly marked.

Again, a potential collector is warned to examine all Camillus M3 trench knives to determine that they are genuine World War Two production rather than the newly made replicas. These new commerical production knives are sold with leather scabbards which do not resemble the original M6 scabbards. However, it should be noted that other firms have produced fake M6 scabbards within the past 10 years or so. These are generally unmarked but many are excellent reproductions. It should be remembered that the name of the maker, date of production ("1943") and "U.S. M6" were stamped on the front of the original M6 scabbards. Unmarked M6 scabbards in new condition should be approached with care and are almost certainly fake.

The M3 trench knife is certain to remain popular with collectors for many years to come. As stated by M.H. Cole in his excellent book *U.S. Military Knives,* "...the M3 with its blade deeply stamped 'U.S. M3', the maker's name, and '1943' date make it the classic collectors item of the late U.S. military knives."

V-42 Stiletto

The V-42 is among the rarest and most valuable U.S. edged weapons of World War Two. The knife is not considered as extremely rare but it is quite uncommon and prices are usually very steep. The knives can be found in conditions ranging from brand new to extremely well used.

As stated, some minor variation will be found since these V-42 knives were essentially hand-made. However, these variations should be rather subtle. Some of the knives issued to members of the First Special Service Force were modified by their users in the field. The most common modification was blunting the sharp pommel tip because this was more dangerous to the user than the enemy. Some knives will be found with just the tip blunted while others had the entire pommel rounded off. Another much less common modification was grooves cut into the leather handle to increase gripping ability. It is fair to say that the greater the degree of modification, the less desirable the knife for collecting purposes. It has been reported that some V-42 knives were serially numbered. There is no evidence to support this and any such knives marked with serial numbers can safely be assumed to have been altered or are fakes. The only marking on the V-42 was the name of the maker ("Case") stamped between the guard and thumbprint.

Reproduction V-42 knives have been on the market for at least a decade. These knives vary from the originals in a number of respects but a novice collector could be fooled. Close examination is mandatory before a sale of a V-42 is consummated given the very high price tag these knives typically carry.

The V-42's scabbard was plain and unmarked. Some were modified by the Forcemen. The most common modification was shortening the long hanger so the scabbard would not extend so far down the leg. Reproduction V-42 scabbards are around. Since the originals are unmarked, spotting the fakes can be difficult. The metal staples, rivets and stitching should be closely examined with a strong magnifying glass to determine if they appear to be half a century old. Comparison with an original V-42 scabbard, if possible, would be very helpful.

An original V-42 is an outstanding find and could be the centerpiece to a World War Two or military knife collection.

Mark 2 "Kabar"

Mark 2 Navy and Marine Corps knives are still around in relatively large numbers today but the supply seems to be decreasing annually. The Mark 2 knives were made during World War Two by Camillus, Robeson, Ka-Bar and Pal. Some minor variations will exist. The Mark 2 knives stamped "U.S.M.C" are a bit more popular than the "U.S.N." knives and, as might be expected, the knives made by Ka-Bar are quite desirable.

Mark 2 knives were produced after World War Two by Camillus, Conetta and Utica as well as other firms. The original WWII knives are much more in demand and more valuable than the post-war knives for collecting purposes.

Both Navy and Marine Corps Mark 2 knives were issued with leather scabbards, many marked either "USN" or "USMC". These were later replaced by gray plastic scabbards. The leather scabbards are more popular with most collectors today.

The Kabar is closely associated with the Marine Corps operations and is a must for a Second World War collection. Fortunately, obtaining a good specimen is still relatively easy and not too expensive.

Marine Raider Stiletto

The Marine Raider Stiletto is another popular weapon with collectors. The weapon's limited production and association with the elite Raiders make it a very collectible weapon. All the knives were made by Camillus.

When evaluating a Raider Stiletto for potential purchase, several things should

be kept in mind. Many specimens (probably well over half) in existence have been damaged to some extent. One common problem was broken blade tips. The stiletto blade was particularly prone to breakage in this area. Many knives so damaged have had their blades repointed, which results in a slightly shorter blade. The original blade length was 7¼" and shorter blades are evidence that the knife in question has been altered. Altered blades are less desirable and less valuable than unaltered blades.

Another common problem with the Raider stilettos is deterioration of the zinc-aluminum alloy handle and guard. Many of these will show signs of damage ranging from hairline cracks to large chunks broken off. Obviously, a knife with severe damage is not a good candidate for collecting purposes.

Most Raider stiletto knives do not have the "USMC" scroll etching on the blade because this was lightly applied and tended to wear off easily. Occasionally, some of these scrolls can be made out by examining the blade under a bright light. Of course, visible blade markings are more desirable for a collectible knife.

Some commemorative Marine Corps Raider Stilettos were produced several years ago. These were attractive replicas but differed in enough details so as to make them easily distinguishable from the originals.

Some fake Raider stiletto scabbards are around. Many of these are well made replicas and can usually be spotted as they will appear to be too new for the condition of the knife. Again, one is cautioned that it is possible to artificially age such a scabbard, so close examination is necessary. It should be remembered that even the original scabbard lacks any markings.

Along with the Case V-42, the Marine Raider Stiletto is one of the rarest and most valuable U.S. military knives of World War Two. A nice example would be an excellent addition to any collection.

V-44 "Gung Ho" Knife

Original "Carlson's Raiders" V-44 knives are extremely rare. It has been estimated by the United States Raider Association that less than a dozen originals are in existence. The only difference between the original Carlson knives and the standard Collins No. 18 knife is the serial number (1 to 1000). Unfortunately, some V-44 knives are believed to have had bogus serial numbers stamped. Therefore, unless the provenance of a serially numbered V-44 is known, a substantial sum should not be invested since proving its authenticity is difficult, if not impossible.

The un-numbered V-44 knives are not particularly common but can be found today. The most common variant is the type with black plastic grips. The more desirable variant with the green horn handles is harder to find. As stated previously, these un-numbered knives were used by other Raider and Marine units, so they are legitimate and very collectible WWII knives in their own right.

The Collins V-44 knives are impressive weapons and are not often seen in a number of World War Two collections. A nice example, especially the green horn handle variety, would add much interest and color to a collection.

Miscellaneous Knives

The various other knives mentioned are not as avidly sought after as most of the other combat bayonets and knives but are still of interest to many collectors.

The USMC Medical Corpsman's Knife has always been fairly popular due to its impressive appearance and the bold "USMC" blade marking. These knives are still relatively common and generally reasonably priced. A number of different makers produced these knives and some collectors wish to acquire one of each. The leather scabbards will be found marked with dates ranging from 1942 to 1945.

The USMC Intrenching Machete is a relatively scarce knife and is not often seen in many collections. The knife was made by Collins and Disston. It is seldom encountered on the market today and has long been undervalued.

The various other types of World War Two machetes are still around in reasonable numbers today and prices are usually within reach of most collectors. The Mark 1 and Mark 2 machetes are a bit less common than the more widely issued 18" variety although none are rare. Many of the 18" machetes are missing their original canvas scabbards, and some reproduction scabbards may be found. The originals are marked "US" and dated. Some plastic machete scabbards may be seen but these are post-war issue.

The field of edged weapons is often all but disregarded when studying the infantry weapons of World War Two. As we will see in the pages that follow, the American infantryman trained with and used a wide variety of weapons ranging from pistols to mortars. The bayonet and knife are sometimes forgotten when compared to these other weapons, but they were nevertheless valuable tools and weapons to the GI. Their role in the American infantry arsenal of the Second World War should not be overlooked.

Handguns

During the First and Second World Wars, most of the European armies issued handguns primarily as badges of rank for officers. The American military, on the other hand, has viewed the handgun as a valuable weapon in its own right and has issued pistols and revolvers in much greater numbers than most other nations during this period.

This is not to suggest that all, or even most, of the American infantrymen of World War Two were armed with handguns. However, handguns were widely issued to many non-commissioned officers, all grades of officers, members of crew-served weapons, aviators, tankers and a variety of other types of personnel.

The various Army and Marine Corps Tables of Organization and Equipment (TO&E) did not call for the issuance of handguns to large numbers of front line non-commissioned infantrymen. Their basic weapon was the rifle or automatic rifle and, in theory, they had no need for a handgun. In practice, most infantrymen felt otherwise, and it was not unusual for many to obtain and carry handguns. The method of obtaining such weapons was not always strictly according to regulations (to put it mildly). The official tolerance for infantrymen carrying handguns varied widely from unit to unit depending largely on the attitude of the commanding officer. During training or when stateside and in other non-combatant situations, the regulations were generally adhered to and a soldier caught with a handgun and not authorized to have one was usually relieved of the weapon. Any other sanctions would be up to the officer handling the situation. Unless the handgun in question had been stolen or some other serious breach had been committed, a reprimand was often the only punishment. In front line combat situations, however, the possession of a handgun by a soldier who was not issued one seldom caused any problems. As one World War Two combat veteran stated regarding the subject, "We were too busy trying to stay alive to worry about whether or not somebody was supposed to be carrying a pistol." This unofficial use of handguns by soldiers is also discussed in the book *Pistols; A Modern Encyclopedia,* in which the author states that "On many Army stations...the attitude has always been, 'If I get in a jam bad enough to need my pistol, I can always worry about regulations after I have survived.'"

Not all of the handguns used unofficially were government issue weapons. A number of privately procured pistols and revolvers found their way into the combat zones regardless of the regulations and many were put to good use. A case in point was cited in the book, *Guadalcanal-Starvation Island*, about the experiences of a young eighteen-year-old Marine corporal who found himself suddenly and unexpectedly surrounded by a large group of Japanese.

All Carlo Fulgenzi had to fight them off was a Colt .32 caliber revolver he had smuggled ashore, a gift from his father. He had only the six rounds in the cylinder.... Immediately, four Japanese dived into the trench, they could not see Corporal Fulgenzi, but he could see them silhouetted in the entryway. The leader was only a foot away when Carlo Fulgenzi lifted the barrel of his Colt pistol and squeezed off a round into the man's forehead. The first Japanese pitched to the side, and Fulgenzi put a round into the second head. And the third. And the fourth. He started to climb out of the dugout to make his escape when he ran headlong into a fifth Japanese. The man had his rifle raised and he was already squeezing the trigger when Fulgenzi shot him dead.

This passage vividly illustrates the value of a handgun in close-quarter combat when no other weapon may be available.

Of course, not all pistols were used in duels to the death. As one Marine veteran confessed, "The only

(top) World War I production M1911 .45 pistol. (bottom) World War II M1911A1 .45 pistol. Both types were widely used in the Second World War.

time I fired a Colt automatic (my allotted sidearm) was on a range in Honolulu." Even though, relatively speaking, few pistols were actually fired in anger, handguns gave many soldiers a much needed measure of security. As stated by Col. John George in his book *Shots Fired in Anger,*

My own pistol was a constant source of comfort to me after dark, and I always had it in my hands. There is no room in a foxhole to wield a rifle against an assailant who is inside the hole with you. The only answer is a pistol.

The need for handguns in modern warfare had been the subject of debate for quite some time prior to World War Two. A number of people in and out of the military have long argued that a handgun is not really a valid weapon for an infantryman armed with the latest in modern weaponry. However, most combat troops had an entirely different opinion regarding handguns. As stated in *Pistols; A Modern Encyclopedia,*

Theorists have been knocking down handgun usefulness for centuries, and staff officers, officially armed with handguns, have been taking them away from GIs for just as long, and the ever practical fighting soldier has continued to beg, borrow or steal a handgun for his personal protection right up to this day.....The remarkable thing is just how often you can turn a soldier upside down, and — whoops!—a loaded pistol falls out before the loaded dice, both being carried to glean some slight advantage from a not too munificent fate.

The bayonet has been reduced to the size of a heavy hunting knife, and bayonet practice is kept on the training schedule "as a morale-building factor." Now I ask you: throw a bayonet, scabbard, and the front stud from the end of your shoulder arm (if you didn't have a bayonet you wouldn't have that ungodly hunk of iron dangling from the front of your rifle barrel) on a scale and balance it against...a handgun, loaded mind you—and I'll eat my hat if the handgun doesn't weigh less.

The author goes on to make the valid point that ".....tables of organization and equipment, military fads, theories and regulations and the rest of it can go straight to hell! There is just no substitute for the old equalizer as (part of) the soldier's personal equipment."

M1911 and M1911A1 .45 Pistols

Without question, the most famous United States military handgun of this century is the Model of 1911 .45 pistol and its variants. Invented by the legendary John M. Browning and developed by the Colt Patent Firearms Manufacturing Company, the M1911 is known to several generations of Americans as the ".45 Automatic" or simply the ".45."

The .45 was developed in response to serious problems encountered with the .38 caliber revolvers used in the Philippines during the Spanish-American War and the subsequent "pacification" campaigns. The anemic .38 Long Colt cartridge failed miserably in combat, and the situation was so bad that some of the virtually antique .45 caliber Model of 1873 Single Action Army revolvers were called out of retirement and refurbished for use in the Philippines. The old black powder .45 Colt cartridge was a formidable man-stopper, although the antiquated single action design left much to be desired.

After the unpleasantness in the Philippines died down, the U.S. military establishment searched in earnest for an adequate replacement for the unsatisfactory .38 revolvers. A more modern Colt revolver design was adopted for use with the .45 Colt cartridge as the Model of 1909. These revolvers were procured in rather small numbers as a stop-gap measure. The government actually wanted a semiautomatic or self-loading pistol chambered for a .45 caliber cartridge. After extensive trials and testing, the Model of 1911 pistol chambered for the .45 Automatic Colt Pistol (ACP) cartridge was adopted. It should be pointed out that while the M1911 is invariably referred to as an automatic, it is actually a semiautomatic or self-loading design.

The M1911 had been manufactured by Colt from the time of its adoption and by the Springfield Armory in 1914 and 1915. By the time of America's entry into the First World War, the small pre-war U.S. Army and U.S. Navy had been substantially equipped with the new pistols and production had slowed to a trickle. With the rapid expansion of America's military machine, the demand for pistols soon overwhelmed the available supply. Colt immediately stepped up production of the M1911 but the Springfield Armory was too burdened with production of the M1903 rifle to resume manufacture of the .45 pistol. Plans were immediately formulated to have the M1911 produced by a number of commercial firms. However, the only company other than Colt to turn out any real quantity of pistols during World War One was Remington-UMC, which produced approximately 21,000 M1911s during this period. The vast majority of M1911 pistols made during World War One were produced by Colt, but if the war had lasted even a few more months, six or eight other firms would have been into full scale production of the weapon.

By the time of the Armistice in November of 1918,

World War II production M1911A1 .45 pistol. (Hayes Otoupalik Collection)

M1911A1 .45 pistol (left side). Note the arched mainspring housing, one of the differences between the M1911 and M1911A1 models. (U.S. Army)

Government property markings on M1911A1 .45 automatic pistol.

American troops training during World War II. Note the .45 automatic pistol in the hand of the soldier on the left. (U.S. Army)

over 60% of the Doughboys in France were armed with .45 automatics. The M1911 proved itself to be an outstanding military handgun during World War One and its potent short range stopping power was very valuable in many trench warfare encounters. After the war ended, a great number of .45s went home in the duffel bags of members of the AEF but there remained adequate numbers in inventory to meet the needs of the pared-down post-war U.S. military.

The M1911 pistol remained the standard service handgun of the U.S. Army, Navy and Marine Corps after the First World War. Its success in France during 1917-1918 ensured its continued prominence as the standard American military side arm, and no real developmental work was done during this period on another pistol. There were a few minor problems noted during World War One that led to changes in the configuration of the trigger, hammer and grip, and slight frame modifications. These changes were incorporated into new production pistols, and in June of 1926, the nomenclature was changed from M1911 to M1911A1. OCM Item 5453 dated May 17, 1926, stated "...as a means of ready distinction between the two models, it is agreed that all pistols bearing serial numbers under 700,000 should be designated M1911 pistols, while pistols bearing serial numbers beginning at 700,000 should be designated M1911A1 pistols..." Few M1911A1 pistols were manufactured from the time of its adoption until just prior to the Second World War because there were sufficient stocks of M1911 pistols on hand to meet the demand.

This situation quickly changed with America's involvement in World War Two. Colt stepped up production of the M1911A1 and contracts were awarded to several other companies to produce the pistol. Below are the firms that made the M1911A1 pistol during the war and their approximate production totals during this period.

Ithaca Gun Company	400,000
Remington-Rand	900,000
Colt	400,000
Union Switch & Signal	50,000

(left)
WWII production M1916 holster.

(center)
WWI vintage M1912 magazine pouch.

(right)
WWII M1923 magazine pouch.

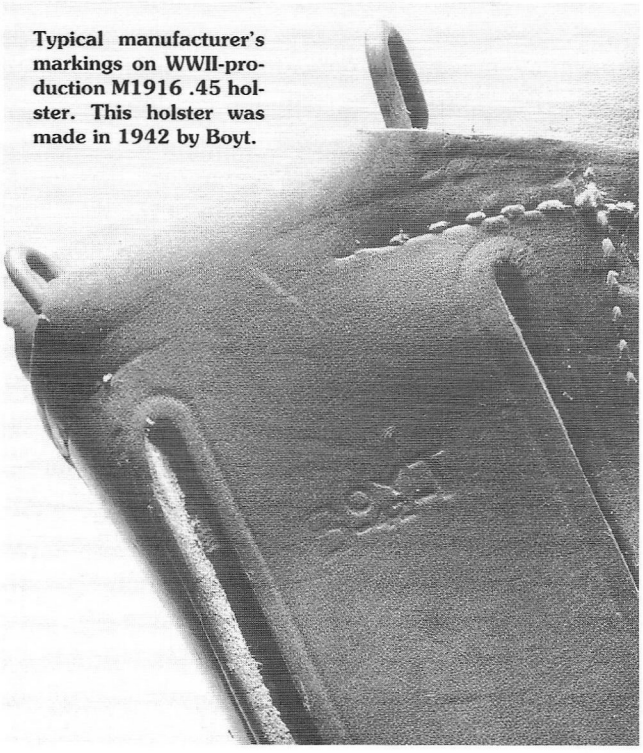
In addition, the Singer Company received an Educational Order for the production of 500 M1911A1 pistols, but the firm never produced the .45 in quantity.

The older M1911 pistols still in inventory were inspected and issued. Many of these guns required some refurbishing work to make them serviceable. This refurbishing work, known as C&R (Cleaning and Repairing), rebuilding or overhaul by the Ordnance Department, generally consisted of replacing any worn or unserviceable parts and refinishing the pistols with the standard parkerizing. The initials of the ordnance facility performing the rebuilding work were stamped on the frame of the pistol.

The .45 automatic saw widespread use in all theaters of war. As in the First World War, the pistol proved itself to be one the finest military handguns ever produced. It was sometimes criticized as being heavy, awkward and inaccurate, but it was very reliable and possessed a great deal of stopping power. The pistol has always been a short range weapon and, within these limitations, the .45 automatic was a superb performer. A good illustration of the .45's effectiveness was an incident that occurred on Guadalcanal.

There was a moment of heart-stopping drama at the division CP when a sword-wielding Japanese officer stepped into the open with two riflemen and headed directly for Archer Vandegrift, who was in the open, alone and unarmed. MG Sheffield Banta, an utterly unflappable old salt, stopped typing a report long enough to unholster his .45-caliber automatic pistol and plug the officer dead in his tracks.

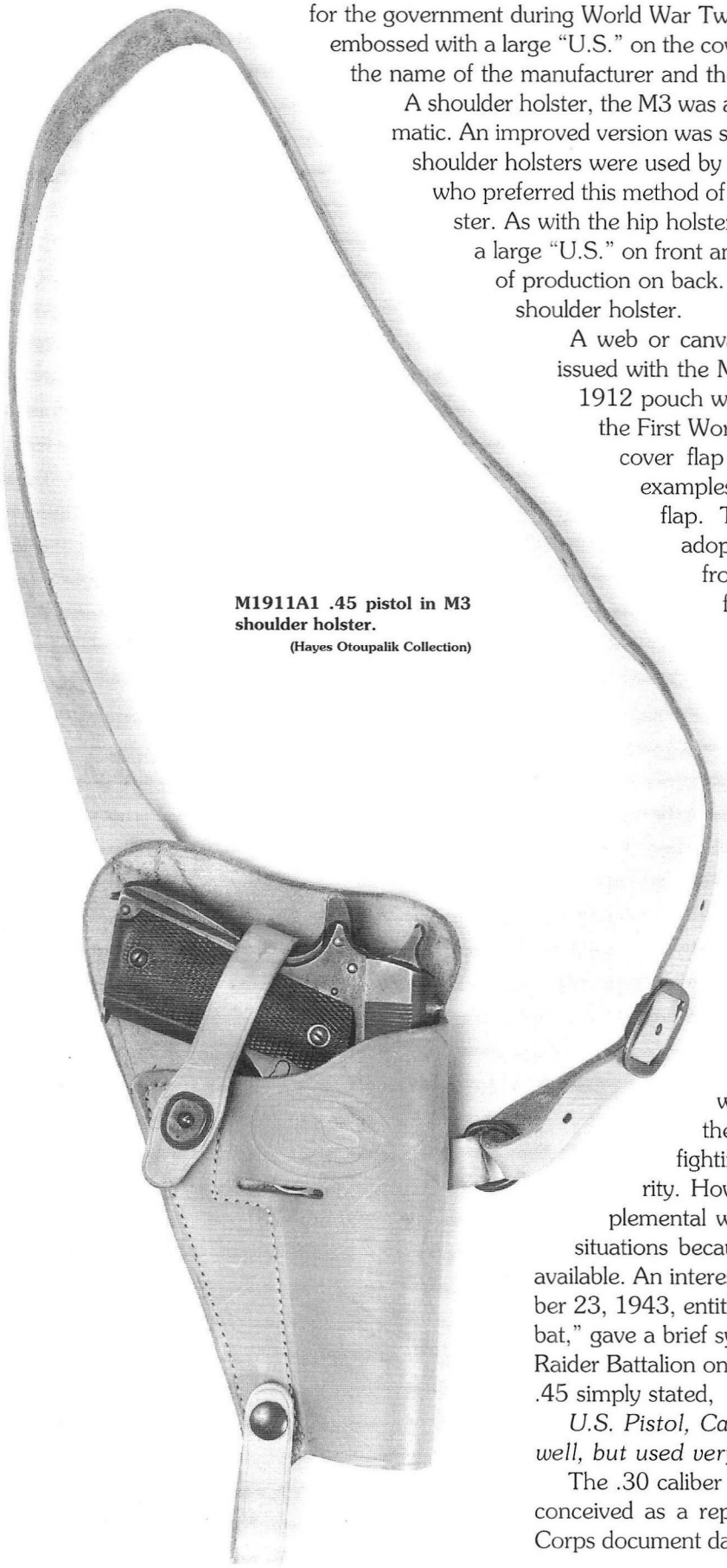
A leather hip holster, the Model of 1912, was adopted for the M1911 soon after its introduction into service. This model allowed for the holster to swivel for cavalry use. Just prior to World War One, the Model of 1916 holster was adopted. It was very similar to the M1912 holster but did not have the swivel feature. Both types of holsters had hooks that attached to grommets on the web pistol belt. The M1916 holster was standard issue for infantry use during World War Two. The supply of WWI-vintage holsters was sufficient to meet the demand of the military until World War Two when the M1916 holster was put back into production. Some three million holsters were produced under contract



Typical manufacturer's markings on WWII-production M1916 .45 holster. This holster was made in 1942 by Boyt.

The crew of an M1917A1 machine gun early in World War II. The crewmen are armed with .45 automatic pistols carried in M1916 leather holsters. Note the World War I-style two-pocket magazine pouches attached to the left front of the pistol belts. (U.S. Army)

Troops of the Army's 17th Airborne Division prior to the Rhine jump in 1945. Note the .45 automatic pistols in M3 shoulder holsters worn by the two officers in the center. (U.S. Army)



M1911A1 .45 pistol in M3 shoulder holster.
(Hayes Otoupalik Collection)

for the government during World War Two by 18 different firms. The holsters were embossed with a large "U.S." on the cover flap and were marked on the back with the name of the manufacturer and the date of production.

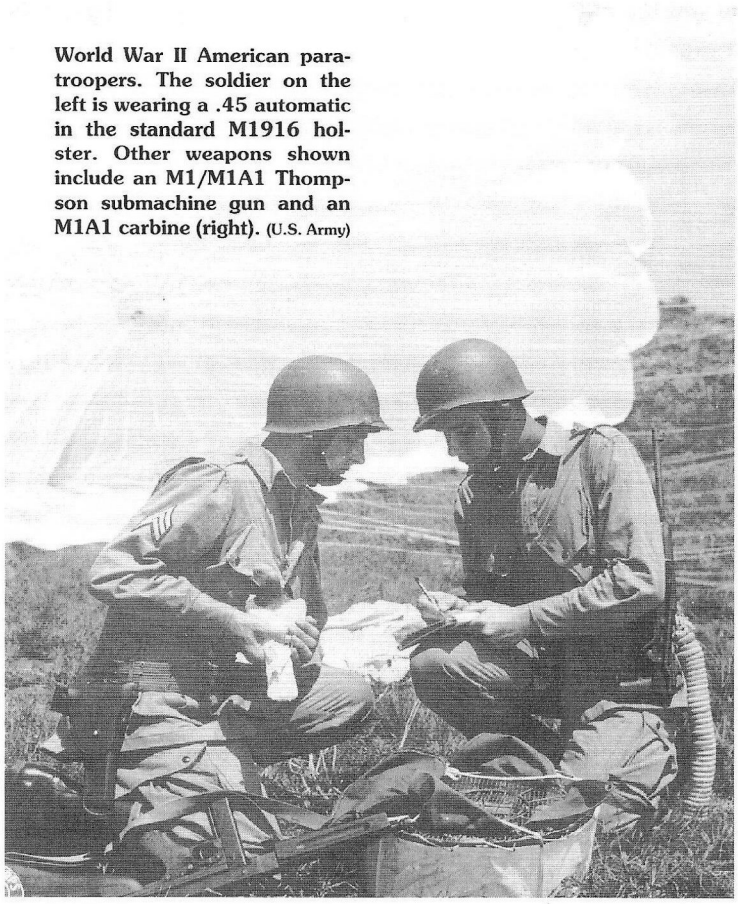
A shoulder holster, the M3 was adopted in 1942 for use with the .45 automatic. An improved version was standardized in 1944 as the M7. These .45 shoulder holsters were used by aviators, tank crewman and many officers who preferred this method of carrying the pistol to the standard hip holster. As with the hip holster, the shoulder holster was embossed with a large "U.S." on front and marked with the manufacturer and date of production on back. A leather strap secured the pistol into the shoulder holster.

A web or canvas two pocket magazine pouch was also issued with the M1911 and M1911A1 pistols. The Model 1912 pouch was widely manufactured and issued during the First World War and was characterized by having a cover flap with two "lift the dot" fasteners. Most examples seen will have "1918" dates inside the flap. The Model 1923 magazine pouch was adopted prior to World War Two and differed from the M1912 pouch chiefly in its cover flap, which had a single snap fastener. Both the M1912 and M1923 magazine pouches had a snap inside the belt loop that mated with a snap inside of the pistol belt and securely held the pouch in place. Few of the M1923 pouches were made prior to World War Two, but large numbers were made from 1941 to 1945. The M1923 pouch was marked "US" in bold letters on front of the cover flap.

Many .45s were obtained by soldiers who were not authorized to be issued the weapons, but, as stated, these regulations were rarely enforced in combat zones. Handguns are basically weapons of last resort, but the hefty .45 on the hip or shoulder gave many American fighting men a much needed measure of security. However, the handgun was generally a supplemental weapon and saw very little use in combat situations because other, more effective, weapons were available. An interesting Marine Corps document dated October 23, 1943, entitled "Report on Infantry Weapons in Combat," gave a brief synopsis on the weapons used by a Marine Raider Battalion on New Georgia Island. The segment on the .45 simply stated,

U.S. Pistol, Cal. .45, M1911-M1911A1. Held up very well, but used very little.

The .30 caliber M1 carbine (discussed later) was originally conceived as a replacement for the pistol. Another Marine Corps document dated January 26, 1943, stated "That a pol-



World War II American paratroopers. The soldier on the left is wearing a .45 automatic in the standard M1916 holster. Other weapons shown include an M1/M1A1 Thompson submachine gun and an M1A1 carbine (right). (U.S. Army)

icy be established of gradually replacing all .45 caliber pistols....in the Fleet Marine Force with M1 carbines or M1 rifles in that order of preference and with priority to new organizations...." Another section of the report stated bluntly that "...Practically all officers seem to be in favor of getting rid of the pistol."

The document went on to conclude "...That additional pistols be procured only to meet current needs, if and when sufficient pistols are not released by the issue of carbines to fill requirements."

While the carbine was manufactured and issued in vast numbers, it never succeeded in the original goal of replacing the pistol. In fact, it was quite common for some soldiers to be armed with both a .45 automatic and an M1 carbine. As an illustration of the .45's continued popularity during World War Two, the U.S. Marine Corps Table of Organization & Equipment (TO&E) in 1942 authorized 798 .45 pistols for a division and, by 1945, the authorized figure had been increased to 1,707, the above official policy notwithstanding.

The situation was much the same in the U.S. Army. While, officially, the carbine was supposed to be the .45's replacement, the total of M1911A1 pistols procured during World War Two was 1,878,742.

After World War Two, the M1911A1 stayed on in the government's inventory and remains, to a limited extent, an item of issue today. It is interesting to note that no government contract .45 automatics were made after 1945 and most of the ones still in service today have been rebuilt several times. The .45 automatic was the most widely issued United States handgun of the Second World War and it provided valuable service to the American fighting men.

M1917 Smith & Wesson and M1917 Colt .45 ACP Revolvers

To digress a bit, when America found itself embroiled in the First World War, the standard issue M1911 .45 automatic was in short supply. While other firms were tooling up to produce the weapon, other sources of handguns had to be found to help alleviate the critical shortage.

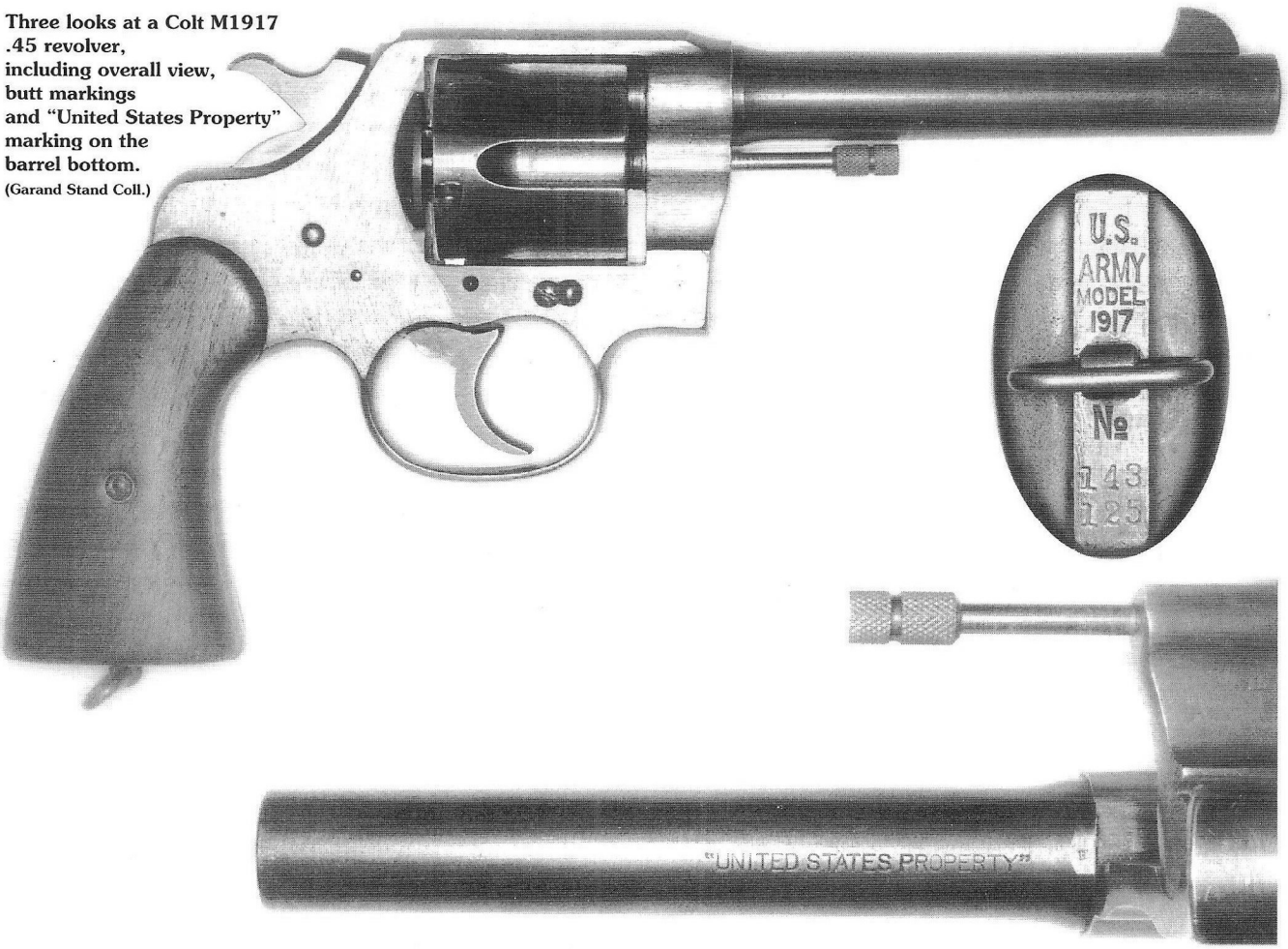
Although Colt was very busy with production of M1911 pistols as well as machine guns during this period, the company did possess the tooling and fixtures necessary to manufacture its large double action revolver, the New Service. This was the same basic revolver adopted previously as the Model of 1909 chambered for the .45 Long Colt cartridge. It was decided by the Ordnance Department to have Colt produce this revolver but have it chambered for the standard .45 ACP cartridge. Since the .45 ACP was a rimless round, it was necessary to devise a method of loading this cartridge into the revolver's chamber and allow for its extraction. A simple piece of sheet metal stamped into a half moon shape neatly solved this problem. The modified revolver was adopted as the Model of 1917, and Colt supplied approximately 150,000 of them to the government between October of 1917 and December of 1918 when production ceased.

The firm of Smith & Wesson also had the capacity to manufacture a version of its large frame revolver chambered for the .45 ACP cartridge in the same manner as the Colt New Service. Smith & Wesson was given a contract to produce a modified version of its revolver and about 153,000 were delivered to the government until production stopped in March of 1919. The Smith & Wesson revolver was given the same Model of 1917 designation as the Colt. Both the Colt and Smith & Wesson revolvers were marked "United States Property" under the barrel and had the model designation stamped on the bottom of the butt. A lanyard ring was fitted to the bottom of the butt as well.

While the self-loading M1911 pistol was more desirable as a military weapon, the big Colt and Smith

Three looks at a S&W M1917 .45 revolver, including overall view, butt markings and government property markings on the barrel bottom.
(Garand Stand Coll.)

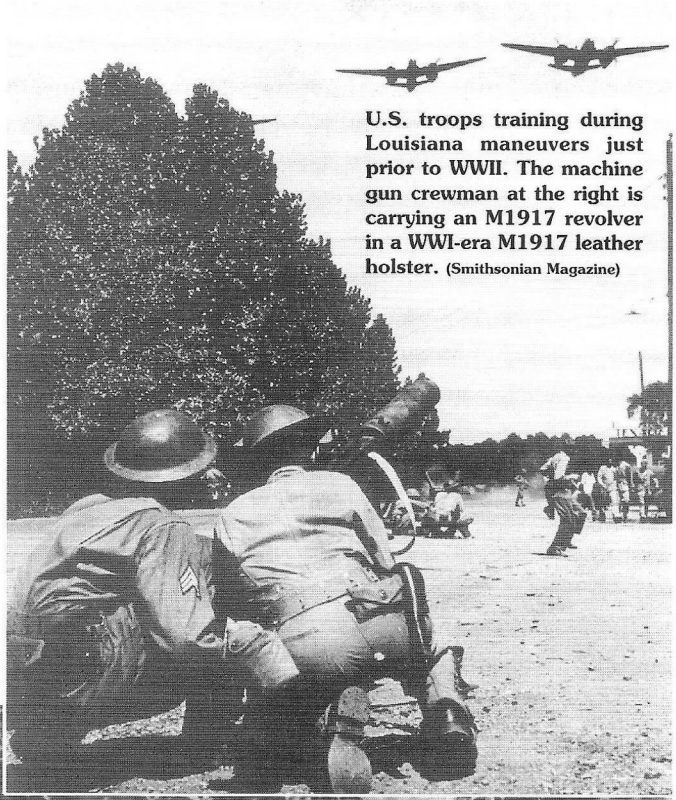
Three looks at a Colt M1917 .45 revolver, including overall view, butt markings and "United States Property" marking on the barrel bottom.
(Garand Stand Coll.)



& Wesson M1917 revolvers nevertheless proved to be very serviceable. Some soldiers even preferred them to the automatic although most would have selected the M1911 had it been available. Due to the shortage of M1911s during the war, a surprising number of the M1917 revolvers found their way into the trenches and were used in front line combat situations during World War One.

After the war, the M1917 revolvers were retired to the war reserve stockpile. Government records indicate that a total of 188,120 M1917 revolvers (96,530 Colt and 91,590 S&W) were "in the field or in stores." With the coming of Pearl Harbor, these were quickly brought into service.

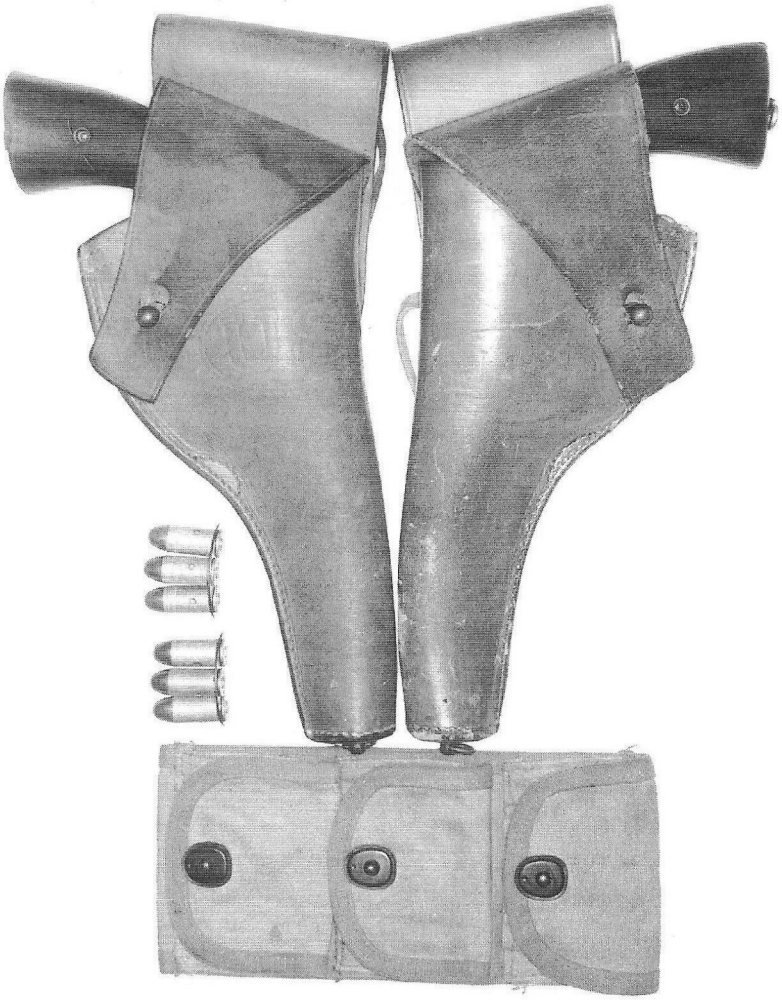
As with the M1911 pistols, these M1917 revolvers were often in need of some refurbishing work to bring them into first class condition. Since these guns had generally seen much less use over the previous 20 or more years than the M1911s, the overhaul work was not usually as extensive and generally consisted of



U.S. troops training during Louisiana maneuvers just prior to WWII. The machine gun crewman at the right is carrying an M1917 revolver in a WWI-era M1917 leather holster. (Smithsonian Magazine)

A Signal Corps field telephone switch board at work during the early days of World War II. Note the Smith & Wesson M1917 .45 revolver hanging from the switch board. (U.S. Army)

M1917 .45 revolvers, holsters and accessories. (left) WWII-production M2 holster. (right) WWI M1909 holster. (center, left) Two three-round "half moon" clips of .45 ACP cartridges as used in M1917 revolvers. (bottom) Pouch holding three pairs of "half moon" clips. (Garand Stand Collection)



thoroughly cleaning and inspecting the guns and refinishing the original blued metal with parkerizing. The M1917 revolvers were fitted with smooth walnut grips and, unlike the M1911 checkered grips, these were often not replaced during overhaul although some examples with plastic grips may be observed. Government records reveal that both Smith & Wesson and Colt received contracts to "...overhaul and remanufacture..." M1917 revolvers during World War Two. In addition, Ordnance records indicate that the Springfield Armory rebuilt 4,071 Colt M1917 revolvers and 10,263 S&W M1917 revolvers during Fiscal Year 1941.

Unlike the First World War, the M1917 .45 revolvers did not see much front line combat service during World War Two. There were greater numbers of M1911A1 pistols available and the revolvers were generally reserved for stateside duties or for personnel such as Military Police. The use of these obsolescent but still serviceable revolvers allowed for the more desirable and functional M1911A1 pistols to be sent to the overseas combat zones. This is not to imply that the M1917 revolvers were never employed in combat during World War Two. According to Ordnance Department reports, 20,993 M1917 revolvers were sent to overseas combat zones where they were generally employed by such personnel as mortar crewmen, headquarters staff and the like.

During World War One, the M1917 revolvers were issued with Model 1909 leather holsters embossed with a large "US" on front. The revolver was secured by a leather top flap that fastened to the body of the holster. The manufacturer's name and date of production was generally stamped on back of the holster. The WWI-pattern holsters were of the cavalry type; when worn on the right hip, the butt of the revolver was facing forward. In October of 1941, a version of the M1909 holster was standardized as the M2 and placed into production. The M2 was essentially a reversed M1909 holster in that it was designed for the butt of the pistol to face the rear. The slightly simplified M4 holster was placed into production in November of 1942 and differed from the M2 in that it had a sewn bottom rather than a separate plug as found on the M1909 and M2 holsters. Like the First World War holsters, the WWII M2 and M4 holsters were stamped on back with the maker and the date of production. During World War One, a pouch holding three sets of half moon clips

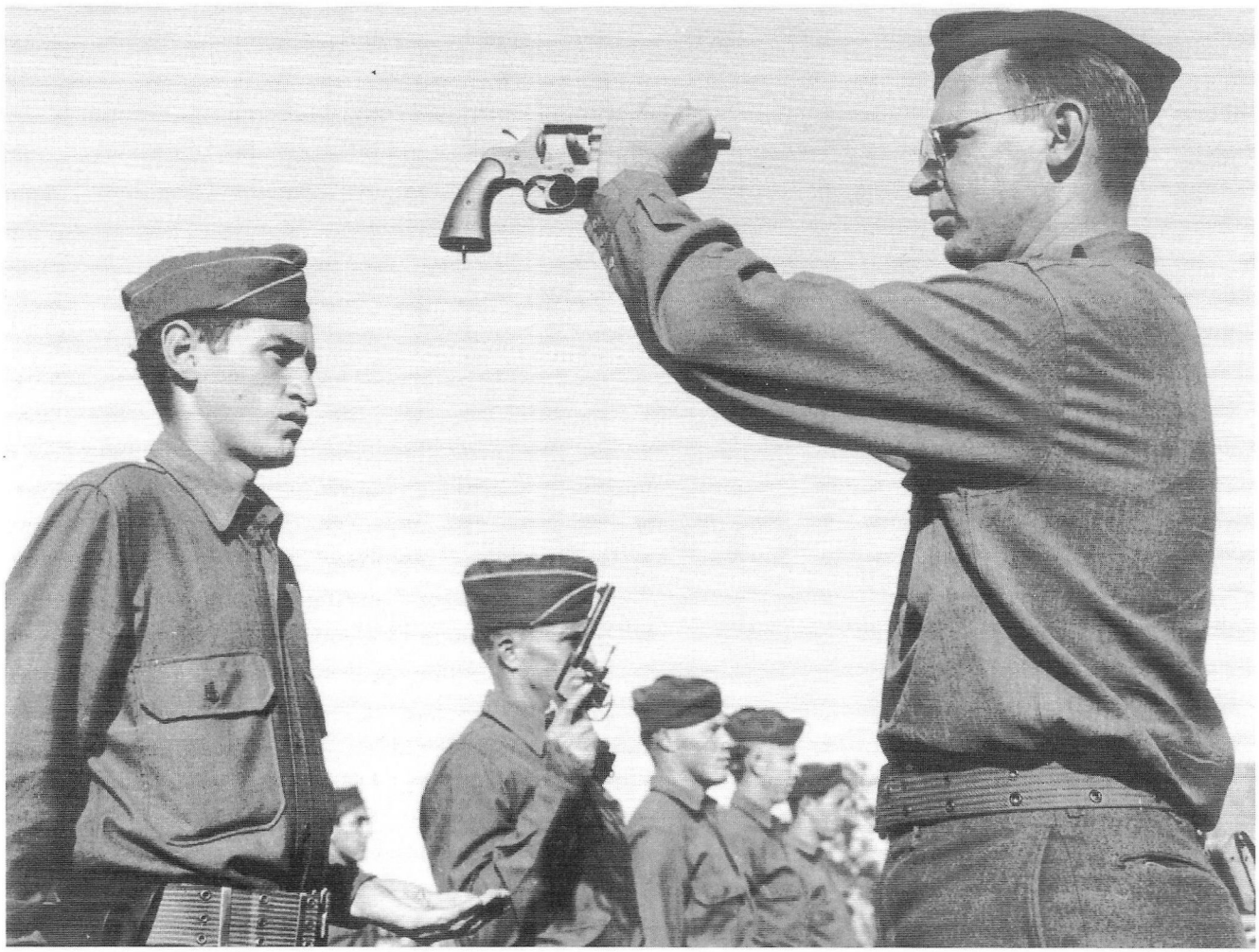
1st Lt. John F. Upchurch, 143d Infantry, 36th Division near Besancon, France, Sept. 10, 1944, taking a surrendering German into custody. Note the S&W M1917 .45 revolver in his right hand. (U.S. Army)

was made that attached to the pistol belt. Many of these also remained in service during the Second World War.

In May of 1945, the Ordnance Department ordered that no M1917 revolvers would be repaired because adequate numbers of .45 automatics were on hand to meet the demand. It was recommended that the M1917 revolvers be declared Obsolete and disposed of to eliminate any further need for repair parts and to reduce maintenance requirements. However, the Army's Provost Marshal General's office objected to declaring the revolvers Obsolete because unforeseen demand could again arise, which would require utilization of the revolvers. For this reason, a number of M1917 revolvers were retained after World War Two chiefly for potential use by Military Police units.

Although, for all intents and purposes, these revolvers were secondary weapons, they nevertheless played a vital supporting role to the standard issue M1911A1 pistol. The big M1917 .45 revolvers served the nation well during two critical times in our history.

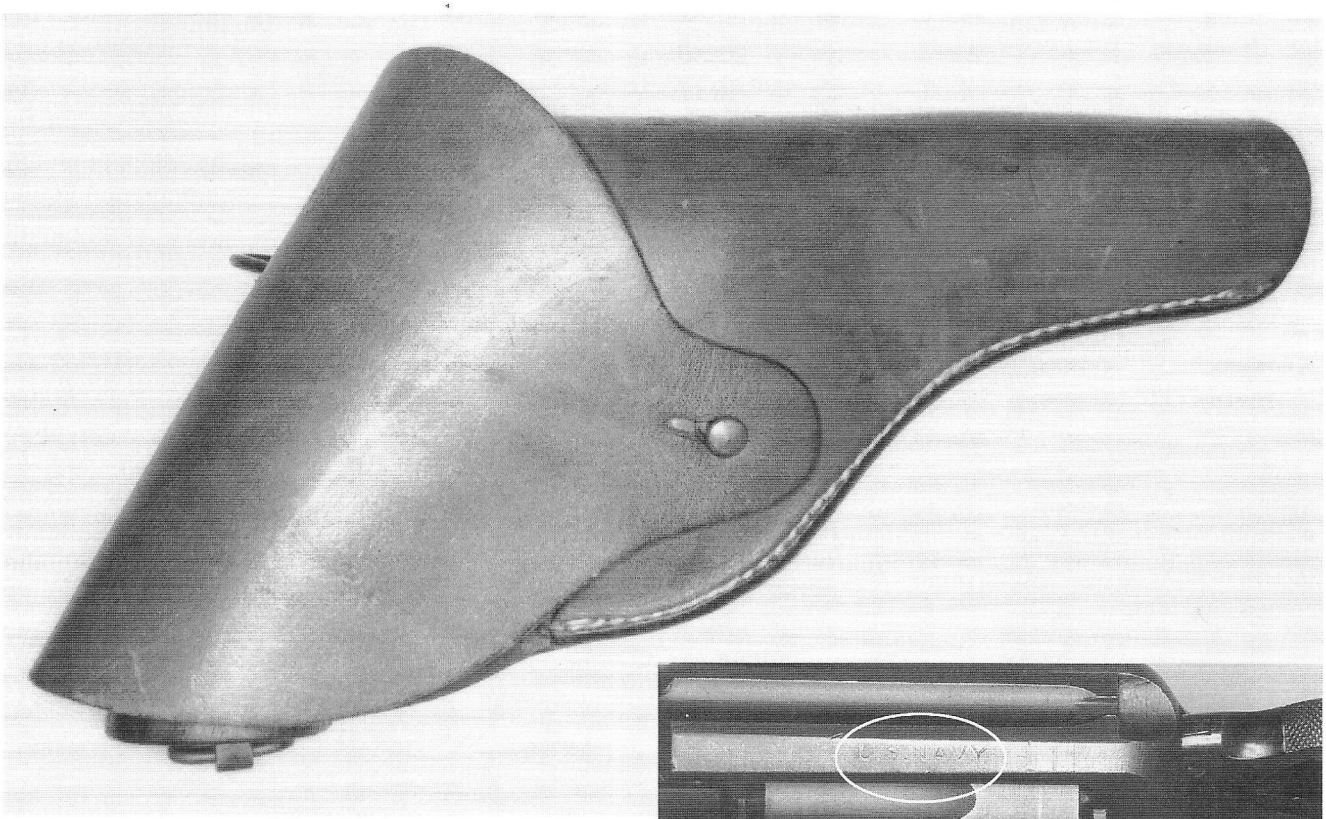
Blurry photograph of a Marine on Tarawa, September, 1943, covering a suspected Japanese machine gun position with his S&W M1917 revolver. (USMC)

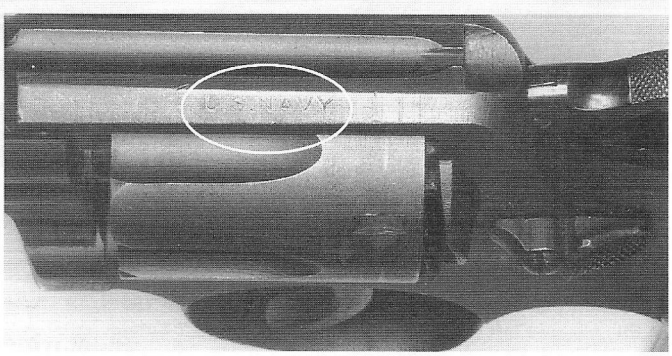


Soldiers undergoing inspection during World War II. The handguns being inspected by the officer are Colt M1917 revolvers. The soldier at the extreme left has a World War I-style M1917 holster. (U.S. Army)

Smith & Wesson .38 caliber Victory Model revolver.
(Garand Stand Collection)

Location of serial number on Victory Model revolvers. Note the "V" prefix.
(Garand Stand Collection)





(above) Belt holster for Victory Model revolver.
(Garand Stand Collection)

(right) "U.S. NAVY" markings (circled in white) as found on some S&W Victory Model revolvers. (Garand Stand Collection)

Smith & Wesson
Victory Model Revolver

In the early days of the Second World War, the supplies of handguns in inventory were insufficient to completely meet the demand. As we have discussed, the M1911 pistols and M1917 revolvers in inventory were issued to help close the gap between supply and demand, while production of the M1911A1 was increased. Even with these efforts, the requirements for handguns by the military were greater than the number of guns available. While the .45 pistols and revolvers were recognized as being the best type of handgun for the infantryman, other types of military personnel not directly involved in ground combat could be equipped with somewhat less efficient handguns. Smith & Wesson had available production capacity to manufacture a version of its "Military and Police Model 1905 Revolver, Fourth Change". The model was known as the M&P and, later, the Model 10. Smith & Wesson had previously manufactured large numbers of this weapon in .38 S&W caliber for the British.

In order to arm Navy and Marine Corps aviators and other personnel with handguns, the government contracted with S&W in early 1942 for a quantity of M&P revolvers chambered for the .38 Special cartridge. These revolvers were dubbed the Victory Model. Although utilization of the .38 Special cartridge meant the introduction of another item into the already cumbersome supply system, this practice enabled the government to obtain large numbers of revolvers in a short period of time. The .38 Special cartridge used with these revolvers was manufactured with a jacketed bullet rather than the lead bullet typically used in commercial ammunition to comply with the Hague and Geneva Conventions.

Government records indicate that some 256,640 Smith & Wesson Victory Model revolvers were delivered to the United States armed forces during the war. An early World War Two Navy document dated February 14, 1942, entitled "Report on Rifles, Pistols, Revolvers, Shotguns and Submachine guns on hand" at the Norfolk, VA Naval Supply Depot stated that "292 Revolvers, D.A., Smith & Wesson, Cal. 38" were "on hand." The various Naval Supply Depots received the Victory Model pistols from Smith & Wesson and distributed them to the appropriate units.

The Victory Model revolvers were rather widely issued to Navy and Marine aviators and were typically carried in a shoulder holster although a belt holster was produced as well. Other types of personnel such as Shore Patrol (SPs) and security personnel (both military and civilian) guarding government plants were often issued Victory Model revolvers.

U.S. Navy pilot with S&W Victory Model revolver in shoulder holster. (U.S. Navy)

It has been reported that some Marine infantrymen "appropriated" Victory Model revolvers for their personal side arms. This practice, at least among some of the U.S. Marine Raiders, is confirmed in the book *Our Kind of War* which states,

The M1911A1 .45 automatic was the standard issue sidearm, but also plenty of .38 caliber Smith & Wesson "Victory Model" revolvers saw action.

The Victory Model revolvers were generally popular with their users. Their smaller size and lighter weight as compared to the .45 automatic made them easier to carry, particularly in the cramped confines of an aircraft cockpit. Obviously the .38 wasn't as potent as the .45, but its use as a supplemental weapon made it adequate for its intended purposes. Frankly speaking, the flyers and other personnel who were issued the Victory Model .38s knew that there was little chance their lives would be staked on the pistol.

Colt Commando

In order to supplement the Smith & Wesson .38 caliber revolvers, the government contracted for some .38 Special revolvers from Colt. The gun supplied by Colt was its Official Police model and was dubbed the Commando.

Like the Victory Model, the Commando was a conventional double action revolver with a parkerized finish and chambered for the .38 Special cartridge. Most examples were supplied with 4" barrels although a number of guns were delivered with 2" barrels. Government records indicate that approximately 45,000 Colt Commando revolvers were delivered through February of 1945 when the contracts were cancelled. The Norfolk, Virginia, Naval Supply Depot reported on February 14, 1942 that "1,515 Revolvers, D.A., Colt, Caliber .38" were "on hand" at that facility.

Unlike the Victory Model, which saw rather extensive issue to Navy and Marine pilots, the Colt Commando saw little issuance to combat personnel. It was used mainly by military security personnel but was also widely used by civilian guards and watchmen assigned to guard government plants and other property deemed essential to the war effort.

In addition to the standard 4" barrel, a version of the Colt Commando with a 2" barrel was also produced. These were referred to as the "Junior Commando" in at least one Ordnance Department document. A memo dated August 9, 1943, stated that 3,000 Commandos with 2" barrels had been delivered to the Port of Embarkation, San Francisco in addition to another 250 for "Military Intelligence." It is not known if these deliveries constituted the entire number of 2" Commando revolvers or if others were procured. In any event, the 2" variety is much less commonly seen than the 4" version.

A conventional leather hip holster was produced for use with both the 2" and 4" version of the Commando. Some of these were marked "US", while others were not martially marked.

Colt Pocket Models

While the M1911/M1911A1 pistols and the M1917 and Victory Model revolvers met the demands of combat personnel for handguns, there was still a need for handguns to arm non-combatant personnel. Such people as general officers, doctors and nurses and some civilians serving as liaisons to the military often had the need for a concealable handgun. These weapons would rarely be fired in anger, but their presence could be a source of comfort in some situations.

The government acquired a number of Colt Pocket Model autoloading pistols to fill this need. From 1942 through 1945, the government purchased some 17,000 Colt Model 1903 pistols chambered for the .32 ACP cartridge.

During this same time period (1942-1944), a smaller quantity of 3,700 Colt Model 1908 pistols were acquired. This model was very similar to the M1903 but was chambered for the slightly more potent .380 ACP cartridge. The final contract for .380 pistols was granted in 1944 and called for 1,500 guns. The guns from this last contract were sufficient to meet the demand for the rest of World War Two and the supply was not exhausted until July of 1950.

The Colt Pocket Model was issued when an officer received his promotion to general during World War Two. Reportedly, the general had his choice of either

(left) Caliber .38 Special Colt Commando revolver with 4" barrel. (TM 9-2200)
(right) Colt Commando with 2" barrel, referred to in some government documents as the "Junior Commando." (TM 9-2200)

Three views of a U.S. issue Colt .32 Pocket Model pistol. To the left, it is shown with its issue shoulder holster; below are an overall view of the right-hand side of the pistol and a close-up of the markings.

(Hayes Otoupalik Collection)

the .32 or .380 variety when possible. In addition to being the standard side arm for general officers, Colt Pocket Model pistols were issued to a variety of personnel, including agents of the Army Intelligence, Military Police, CID and Provost Marshalls. It has also been reported that some of these pistols were issued to military doctors and nurses. In addition, substantial numbers of the Colt Pocket Model pistols were also acquired by the Office of Strategic Services (OSS) to arm operatives and other clandestine personnel.

While the Colt Pocket Model pistols were obviously not optimum combat weapons, they were entirely adequate for their intended purposes.

Other Handguns

In addition to the handguns detailed above, the government acquired a number of other types for specialized uses. These included several hundred Colt Detective Special 2" revolvers for military intelligence personnel and a number of .22 caliber pistols for training and other purposes.

Many collectors specialize in WWII military handguns and the wide variety of variants make it a fertile field for collecting and study. Once rather common and inexpensive, nice examples of WWII military handguns are becoming increasingly harder to find.

Collector Notes

M1911 and M1911A1 .45 Pistols

As stated, the M1911 and M1911A1 pistols have been very popular with collectors for a number of years. Original, unaltered M1911 pistols are much less common than M1911A1 pistols in the same condition. This is because fewer were made and they were subjected to the aforementioned government rebuilding programs. As originally made, the M1911 pistol was finished with blued metal rather than the later dull and non-reflective parkerizing. The M1911 also had finely crafted checkered walnut grips. When these pistols went in for overhaul, the grips were generally replaced with utilitarian plastic grips as found on the WWII-vintage M1911A1s. In addition, the original bluing was removed and the pistols were refinished with parkerizing. Such rebuilt M1911 pistols are good collector items but are not as valuable or desirable as unmodified pistols which retain their original finish and features.

Colt manufactured a number of commercial M1911-type pistols. These can be identified as the serial number had a "C" (Commercial) prefix and the frame and slide were not marked with "U.S. Property" or inspector marks. There were a few M1911s marked with Navy or Marine Corps markings. These are highly prized collectibles and bring a substantial premium over most of the Army marked guns.

The WWII-manufactured M1911A1 pistols are generally easier to find and somewhat less expensive than the WWI-vintage guns. The Colt, Remington-Rand and Ithaca pistols seem to have approximately the same value given comparable condition while the Union Switch & Signal pistols typically bring a bit more due to the smaller number made. The Singer pistols are quite rare and very expensive and a potential purchaser should be very wary when such a gun is offered for sale.

There are several things to look for when evaluating a standard WWII M1911A1 .45 for possible purchase. To begin with, the overall condition of the gun should be carefully examined to ascertain that it has the original finish. The crispness and sharpness of the markings should be scrutinized to determine if the gun has been reparkerized. The serial number should also be correct for the manufacturer of the slide. Table #18 gives the serial number blocks assigned to each manufacturer. If, for example, a pistol has a Union Switch & Signal slide but the receiver indicates a serial number from a block assigned to Colt, the pistol is mismatched and a buyer should pass if he wishes a correct "as issued" specimen. It should be mentioned that several firms, including US&S, made a number of slides for rebuilding purposes, so a mismatched slide may be a perfectly legitimate arsenal rebuild if it has the rebuild marks on the receiver. A legitimate government rebuild is certainly a good collector item, but it is not as valuable or desirable as an original all-matching pistol. A number of M1911A1 pistols with government issue slides but receivers of commercial manufacture will be found today. Obviously, such guns are much less desirable for collecting purposes than arsenal rebuilt pistols.

Original World War Two vintage government issue .45 automatics were once quite commonplace and inexpensive. The rapid increase in collector interest over the past 15 or 20 years has resulted in collectible examples becoming much harder to find and more expensive. Seemingly minor features can add or detract a great deal of value and anyone interested in specializing in the .45 should obtain the book *The Government Models* by William H.B. Goddard or *Colt .45 Service Pistols, Models of 1911 and 1911A1, 1900-1945* by Charles Clawson.

The M1911A1 is the classic American military handgun of World War Two. If a person wishes to have just one pistol as a representative example of a WWII-U.S. handgun, the choice would clearly be the .45 automatic. On the other hand, the many interesting variants of the pistol make it a great theme for an extensive collection in itself.

M1917 Smith & Wesson and M1917 Colt .45 ACP Revolvers

As with the M1911 pistol, unaltered original Colt and Smith & Wesson M1917 revolvers are more highly prized than the guns that had undergone rebuilding during World War Two. The unaltered guns can be identified as they retain their original blued finish and other features. The finish should be examined to determine that it is original. Again, the sharpness of the markings should be looked at as the typical buffing of the metal while rebluing would often wash out the markings somewhat. A WWII rebuilt gun will generally exhibit a parkerized finish and the initials of the arsenal performing the work will be stamped on the frame. A collector wishing to have a M1917 of First World War vintage will

steer clear of a rebuilt gun. On the other hand, a WWII collector will often prefer a M1917 revolver rebuilt during this period.

The value and desirability of the Colt and Smith & Wesson M1917 revolvers seem to be about the same given comparable condition and degree of originality. After World War Two, large numbers of these guns were disposed of on the surplus market at attractive prices.

The M1917 revolvers are not always thought of as World War Two weapons, but they provided valuable yeoman-like service during a critical time in our nation's history. Any example, especially one rebuilt during the war, makes an interesting addition to a World War Two collection as a weapon that played its part in two World Wars.

Smith & Wesson
Victory Model Revolver

Identifying a WWII-vintage Smith & Wesson Victory Model revolver is an easy matter. The serial number found stamped on the butt had a "V" (Victory) prefix. The Victory Model serial numbers were a continuation of the numbers used on the S&W .38 revolvers made for the British government prior to our entrance into World War Two. The U.S. Victory Model was introduced at approximately serial number V-40,000.

After serial number (approximately) 769,000, the "V" prefix was changed to "VS" to indicate that these revolvers were fitted with an improved hammer block to help prevent accidental discharges if the gun was dropped. This change was mandated after the death of a sailor from an accidental discharge of a Victory model pistol dropped on the deck of a ship. Serial numbers had reached approximately VS-850,000 by the time production stopped in 1945.

The Victory Model was finished in parkerizing and had plain (uncheckered) walnut grips, and a lanyard loop on the butt. Victory Model revolvers generally had their topstraps stamped with an ordnance flaming bomb insignia and several types of markings may be observed. The most commonly encountered are "United States Property", "Property of U.S. Navy" markings and "U.S. Property GHD". Some have been reported with "USMC", "USCG" (U.S. Coast Guard) and "Property of U.S. Navy" stamped on the sideplates. A few unmarked examples may be noted.

A few Smith & Wesson Victory Model revolvers with 2" barrels were produced but these are much less commonly seen than the 4" variety. Most of the short barrel Victory Model revolvers reported are devoid of the typical martial markings except for a flaming bomb stamped on the butt.

Victory Model revolvers remain relatively common today and decent examples are not generally tough to find. The Smith & Wesson M&P revolvers used by the British are also quite common but are not as desirable as Victory Models to most collectors and prices are usually much less. These can be easily identified as they have 5" barrels and are chambered for the .38 S&W cartridge rather than the .38 Special. The type of chambering is marked on the barrel. These British revolvers also are typically stamped with English proof marks.

Many Victory Model revolvers were issued with the leather "Holster, Shoulder, Revolver, Caliber .38". These holsters were usually embossed with a "US" on the front and many will be found with cartridge loops sewn to the shoulder strap. Leather hip holsters ("Holster, Hip, Revolver, Caliber .38") were also made for the Victory Model by the Rock Island Arsenal and a couple of commercial firms. These holsters were often utilized by Shore Patrolmen and security personnel. None of the Victory Model holsters are rare but good examples are not particularly common and seem to be getting harder to find.

While not generally thought of as a front line combat weapon, the Victory Model is nevertheless an interesting addition to a World War Two martial arms collection.

Colt Commando

The Colt Commando was simply an Official Police revolver with a parkerized finish and plain plastic grips. The type of special martial markings varied somewhat but the most commonly seen were a small Ordnance Department flaming bomb and the inspector's initials "G.H.D." (Guy H. Drewry) stamped on the left side of the frame. Many examples were not stamped with any martial markings.

The 4" barrel Commando pistols could be utilized with the same type of hip holster as used with the Victory Model revolvers.

Even though the Commando is a somewhat scarcer gun than the Victory Model, its value and desirability are not significantly greater than the S&W. This is due, no doubt, to its lack of use as a combat weapon. Nevertheless, it is a very collectible handgun and would make an interesting addition to a World War Two martial collection.

Colt Pocket Models

The government issue Colt Pocket Model pistols have always been popular with collectors. Both Models (the M1903 and M1908) were prominently stamped "U.S. Property" on the frame. The M1903 .32 caliber pistols were blued until approximately serial number 562000 when the finish was changed to parkerizing. Most, if not all, of the government issue M1908 .380 caliber pistols were blued. The serial numbers of the government issue M1903 Model ranged from 555001 to 572000. The government issue M1908 Model had serial numbers ranging from 134500 to 138000.

Despite fairly low production figures, many of these pistols survived the war and, though not extremely common, can still be found today. The M1908 is harder to find than the M1903, and prices for comparable specimens are usually significantly higher.

Hip and shoulder holsters were produced for issue with these Colt pistols, but custom-made holsters were not uncommon. Often the user simply slipped the pistol into a pocket or dispatch case.

World War II photograph of a typical arsenal rebuilt M1903 rifle. This weapon has a combination of early and late pattern parts typically found in such rifles refurbished during the Second World War. (U.S. Army)

Rifles

The rifle was the basic weapon for most of the American soldiers of World War Two. Indeed, the term "Rifleman" was virtually synonymous with "Infantryman" during the war. The American military rifles of World War Two are the last arms of their type readily available to the general public today. Whether bolt action or semiautomatic, the U.S. service rifles of World War Two are still around in fairly large numbers and are popular with collectors and shooters alike. Many thousands of these rifles were sold after the war through the auspices of the Director of Civilian Marksmanship (DCM) to members of the National Rifle Association and other qualified individuals for very modest sums. The post-WWII U.S. service rifles are selective-fire weapons (i.e., capable of firing fully automatic) that have not been, and most likely never will be, released to the general public. Therefore, the U.S. military rifles of World War Two are the last American service rifles which will be available to future generations to enjoy on the target range and to enhance collections.

U.S. Rifle, Caliber .30, Model of 1903

The "U.S. Rifle, Caliber .30, Model of 1903," better known to several generations of Americans as the Springfield '03 or simply the '03, is one of the most famous U.S. military rifles of all time. Adopted just after the turn of the century in response to problems encountered with the .30-40 Krag-Jorgensen rifle used in the Spanish-American War of 1898, the M1903 rifle was the standard United States military service rifle from the time of its inception until the adoption of the semiautomatic M1 rifle in 1936.

The M1903 as originally adopted had an unusual integral sliding rod bayonet rather than the typically seen knife bayonet. The rifle was chambered for the rimless Model of 1903 cartridge (generally known as the .30-03), which had a round nosed bullet. After the M1903 rifle was in service for a short period of time, deficiencies were noted in both the rod bayonet and the M1903 cartridge. In 1905, the rod bayonet mechanism was discarded and a different type of rear sight was developed. In 1906, the original M1903 cartridge was replaced by the improved Model of 1906, featuring a pointed (spitzer) bullet. The M1906 cartridge soon became famous as the .30-06 and was destined to be the standard United States military rifle and machine gun cartridge for the next 50 years.

The M1903 rifle soon replaced the Krag and was the standard American military rifle at the start of the nation's entry into the First World War in 1917. The rifle had been in continuous production since its adoption at the government-owned and operated Springfield Armory in Massachusetts. The rifle had also been produced by the government's Rock Island Arsenal in Illinois for most of this time, although production ceased from 1914 to 1916 at this facility due to the relatively small demand. With the outbreak of World War One, however, both facilities quickly geared up to produce the M1903 rifle in large numbers. Even with this increased production, supplies lagged behind demand and the M1917 Enfield rifle was manufactured in large numbers to augment the supply of American rifles desperately needed at this time.

With the coming of the Armistice, the M1903

(left) While this may appear to be a photograph of "Doughboys" leaving for France in 1917, it is actually a group of American reservists being called to active duty early in World War II. They have First World War vintage equipment including M1903 Springfield rifles. (V for Victory)

(below) Second World War Army troops practicing the manual of arms with M1903 rifles. The venerable '03 gave valuable service as a training rifle during World War II but also saw wide use in combat. (U.S. Army)

(below) A photograph, circa late 1941 or early 1942, showing a U.S. Army soldier firing an M1903 rifle. This photo is unusual in that the soldier is wearing an early issue camouflage uniform including a cover for the pre-1941 style helmet. (U.S. Army)

American troops firing on Japanese aircraft with their '03 Springfields during the December 7, 1941 raid on Pearl Harbor. Note also the .50 caliber air-cooled machine gun. (U.S. Navy)

remained the standard American military rifle throughout the 1920s and 1930s. The semiautomatic M1 Garand was formally adopted in 1936, but production was very limited for the next several years. On the eve of American's entrance into the Second World War, supplies of the new M1 were very low and most American troops were still armed with the '03 Springfield.

The M1903 rifles in inventory at the start of the war saw a great deal of use as both training arms and combat weapons. The Norfolk, Virginia, Naval Supply Depot reported on February 14, 1942 that it had "11,217 Rifles, U.S. Cal. .30, Model 1903" on hand in serviceable condition and 169 needing overhaul.

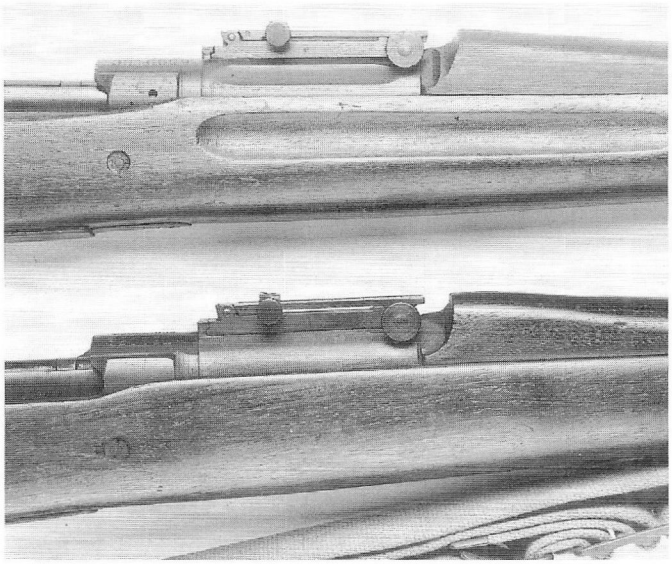
Many people do not realize that most of the U.S. Marine Corps' early Pacific campaigns were fought with the old '03 as the primary service rifle. The Marines on Guadalcanal were armed with the '03; the newer semiautomatic rifles did not come into use until the latter stages of the campaign, when Army troops armed with the new M1 Garand rifles reinforced the weary Marines. Most of our troops fighting in the Philippines prior to their surrender used '03s as well. Many Army troops were armed with '03s during the North Africa and Sicily campaigns and surprisingly large numbers were also used in much of the fighting in Italy and other theaters. During World War Two, the '03 was generally utilized due to a shortage of M1 rifles or other semiautomatic weapons. However, even when other weapons were available, the '03 remained the weapon of choice for some troops due to its reliability and greater inherent accuracy. As stated in the official *History of U.S. Marine Corps Operations in World War II*, "Nostalgia for the reliable '03 was widespread...." A number of '03s remained in front line combat duty until the very end of the war. It must be added, however, that the majority of combat troops greatly preferred the firepower of automatic or semiautomatic weapons.

The M1 rifle began to replace the '03 in Marine Corps service by early 1943. A Memorandum to the Commandant of the Corps, dated January 26, 1943, stated that

M1 rifles are now being received at a rate that will not only permit the equipping of all new Fleet Marine Force organizations but the gradual replacement of M1903 rifles now in the hands of other units. M1903 rifles, as received, will be turned over to the Navy.

In addition to the standard '03 service rifle, three versions of the M1903 modified for sniping use and

World War II Remington M1903 rifles (from top): Early M1903; M1903 (Modified); M1903A3. The M1903 (Modified) was a transition rifle between the finely crafted early Remington M1903 and the later, rather crudely made, M1903A3.



(left) Rear sight as used on M1903 service rifles from 1905 until early 1942 (see top), when the Remington M1903 (Modified) rifle was developed (see bottom). Note the rounded rear sight base that required less machining than the earlier base.

(above) Receiver markings on Remington M1903 and M1903 (Modified) rifles.

fitted with telescopic sights were used during World War Two. These rifles are discussed later in this section.

A number of M1903 rifles were also utilized by the Army and Marine Corps as grenade launching weapons, and these saw much use throughout the war. Many '03s fitted with grenade launchers remained in front line service longer than would have been expected due to the problems encountered with developing a satisfactory launcher for the M1 rifle. In 1942, the Marine Corps Table of Organization and Equipment called for 456 M1903 rifles fitted with M1 grenade launchers to equip a division. As stated in the official Marine *History of Operations,* a rifle squad during this period contained "...a rifle grenadier who was armed with the trusty Springfield M1903 .30 caliber rifle and a grenade launcher." These were gradually withdrawn from service as Garand grenade launchers became available, but a number remained in use through virtually the end of the war. The various rifle grenade launchers are examined in detail later in this book.

Stateside, the '03 was widely used as a training arm. Many new recruits and draftees first learned the manual of arms and close order drill with the '03, as well as practicing the fine art of marksmanship on the rifle range with the weapon. The use of the older M1903 as training rifles allowed the issuance of the

semiautomatic M1 to troops designated for overseas combat duty in larger numbers than would otherwise have been possible.

The M1903 rifle (and its numerous variants) was declared Limited Standard in November of 1944. This designation meant that the weapons in service would remain in use as needed (unlike Obsolete classified arms), but no new procurement would be undertaken. Many of the pre-WWII vintage '03s in storage required some refurbishing. As with the M1911 pistols discussed previously, a number of government ordnance facilities overhauled many thousands of '03s during World War Two. The scope and nature of the rebuilding work could vary from rifle to rifle depending on its present condition, but generally the '03s were rebarrelled, new stocks and other parts added and the metal reparkerized. These rebuilt rifles would be essentially as serviceable as newly manufactured weapons. However, the inventory of pre-WWII '03s was inadequate to meet the demand and other sources of rifles had to be obtained.

Remington M1903 Rifle

The government had taken steps to increase production of the M1, but it was apparent that other sources of rifles were needed. It was decided to resume mass production of the M1903 since the tooling to produce this weapon was still available. However, the Springfield Armory was heavily burdened with Garand production, and the Rock Island Arsenal had long since ceased manufacture of the '03 and was involved with other war production projects. Fortunately, the production tooling for the M1903 rifle was still stored at Rock Island. After some negotiations with the Ordnance Department, the Remington Arms Company accepted a contract to produce the M1903 rifle for the government. Remington transported the Rock Island tooling to its plant and by November of 1941, production of the M1903 rifle was underway. Remington marked their rifles with the company name on the receiver and the initials of the firm (RA) and the date of production on the barrel. The early Remington '03s were essentially identical to the rifles made by Rock Island and Springfield during the First World War and were made with the same quality materials and craftsmanship.

Remington M1903 (Modified) Rifle

As the demand for rifles increased, the workers at Remington became hard-pressed to meet the production quotas. The well-worn tooling acquired from Rock Island, combined with a number of inexperienced workers at Remington, contributed to the problem of slow production. Representatives from the Ordnance Department assigned to the Remington plant felt that the company was paying too much attention to non-essential items, such as the final polishing and fitting of many parts. Remington's engineers working in conjunction with the Ordnance people proposed several time-cutting changes including substituting simple stamped metal components for some formerly milled or forged components, modifying the stock to save production time and eliminating a few non-essential parts completely. These changes would save much machining time and speed up production. These new features began to be incorporated into production rifles beginning in December of 1941 and were phased in over the next couple of months. By March of 1942, the Remington '03 evidenced a number of revisions from the original production rifles. In order to properly identify these rifles, the designation was changed to the "U.S. Rifle, Caliber .30, M1903 (Modified)."

M1903A3 Rifle

The changes made in the M1903 (Modified) rifle did result in faster production, but some additional changes were necessary to further decrease manufacturing time. The only other major component of the '03 that could be redesigned was the M1905 rear sight and its fixed base, as these items required a good deal of machining time. Remington's engineers designed a simple stamped metal adjustable rear sight that was attached to the rifle's receiver rather than the barrel mounted M1905 rear sight. This type of sight saved much production time and was actually a better battle sight than the original pattern. A longer type of hand guard was developed to cover the area of the barrel previously occupied by the M1905 rear sight.

On May 21, 1942, the redesigned weapon was officially standardized as the "U.S. Rifle, Caliber .30, Model of 1903A3." In addition to the new type of rear sight, the M1903A3 rifle utilized many stamped metal components. The fit and finish of these hastily produced rifles were a far cry from the finely crafted early production Remington rifles and the pre-WWII '03s. At this early stage of the Second World War, the government was concerned with getting as many serviceable weapons as possible and cosmetic touches were dispensed with. However, the actions were very strong and the weapons were entirely serviceable in spite of their rather crude appearance.

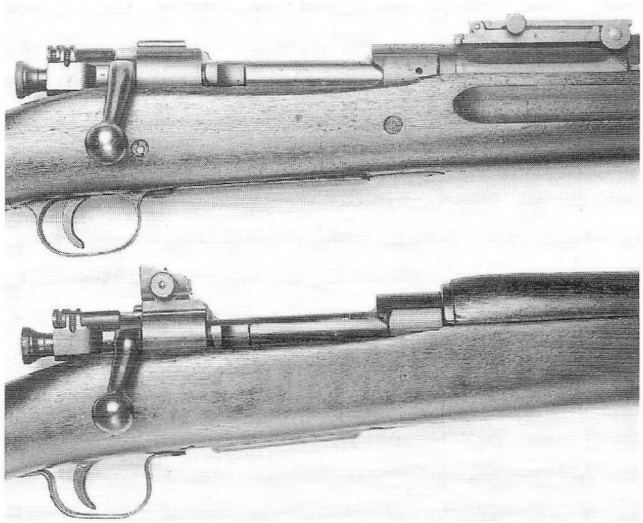
To supplement the Remington's production of the M1903A3 rifle, the government contracted with the firm of L.C. Smith & Corona Typewriter Company in February of 1942 to manufacture the weapon as well.

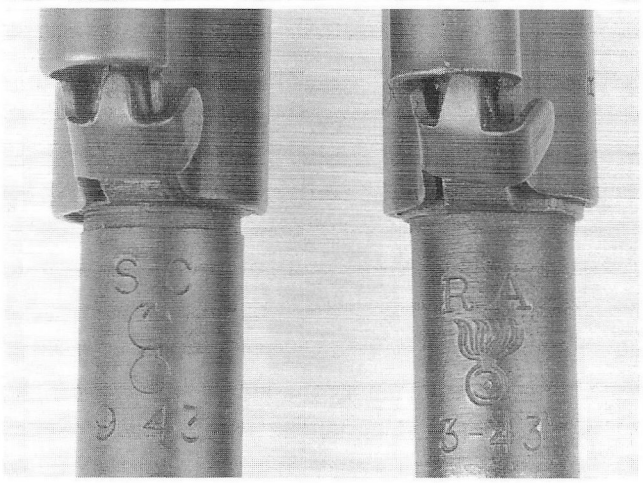
Except for the manufacturer's markings, the M1903A3 rifles made by Remington and Smith-Corona were identical. Both firms delivered large numbers of rifles to the government before the contracts were cancelled in February of 1944, when the production of rifles finally met the demand.

By the time Remington and Smith-Corona had begun large scale deliveries of '03A3 rifles, most of the combat units had been fairly well equipped with M1s. Many of the 'A3s were used as training weapons but a number were employed in combat roles in both Europe and the Pacific. '03A3s were commonly used, especially in Europe, by the Military Police (MPs). Although the M1 was the choice of the vast majority of troops, some preferred the bolt action '03 or '03A3 over the semiautomatic Garand even when the latter weapon was available. Standard issue M1903 and M1903A3 service rifles as well as the M1903A4 sniper variant were used by the U.S. Army in Italy and the China/Burma/India (CBI) theater well into late 1944 and early 1945.

M1903A4 Sniper's Rifle

The U.S. Army was faced with a serious shortage of suitable sniper rifles early in the war. While development was underway on a sniping version of the M1 Garand rifle, the Ordnance Department directed Remington to design a variant of the newly adopted M1903A3 modified to sniper rifle configuration. A very slight modification of the basic '03A3 was standardized in January of 1943 as the "U.S. Rifle, Caliber .30, M1903A4 (Sniper's)." The M1903A4 was essentially the same as the M1903A3 with no front or rear sights fitted. Some commercial components were specified for use with the weapon in order to speed up procurement. These items included the Weaver 330C telescope (later designated by the military as the M73B1) and Redfield "Junior" scope mount. The Redfield mount was attached to the receiver ring and the existing rear sight base. Although no front sight was fitted, the milling cuts were present so the rifle

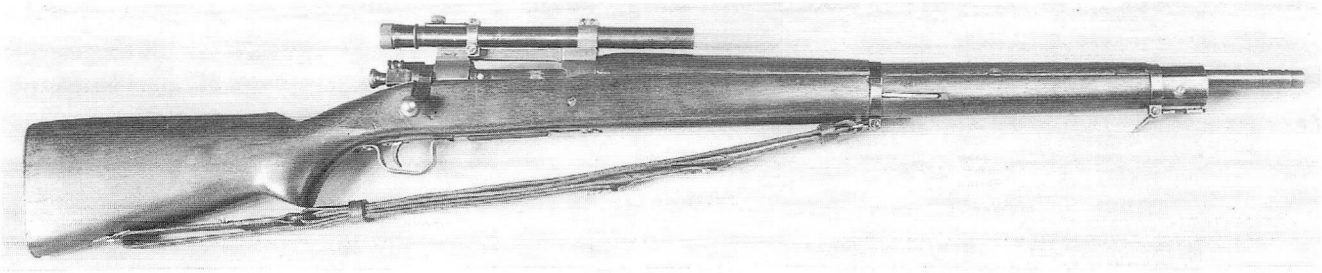




(top) M1903 rifle with M1905 rear sight shown above an M1903A3 rifle with the small peep rear sight moved to the rear of the receiver. This modification on the '03A3 decreased machining time and actually was a better battle sight.

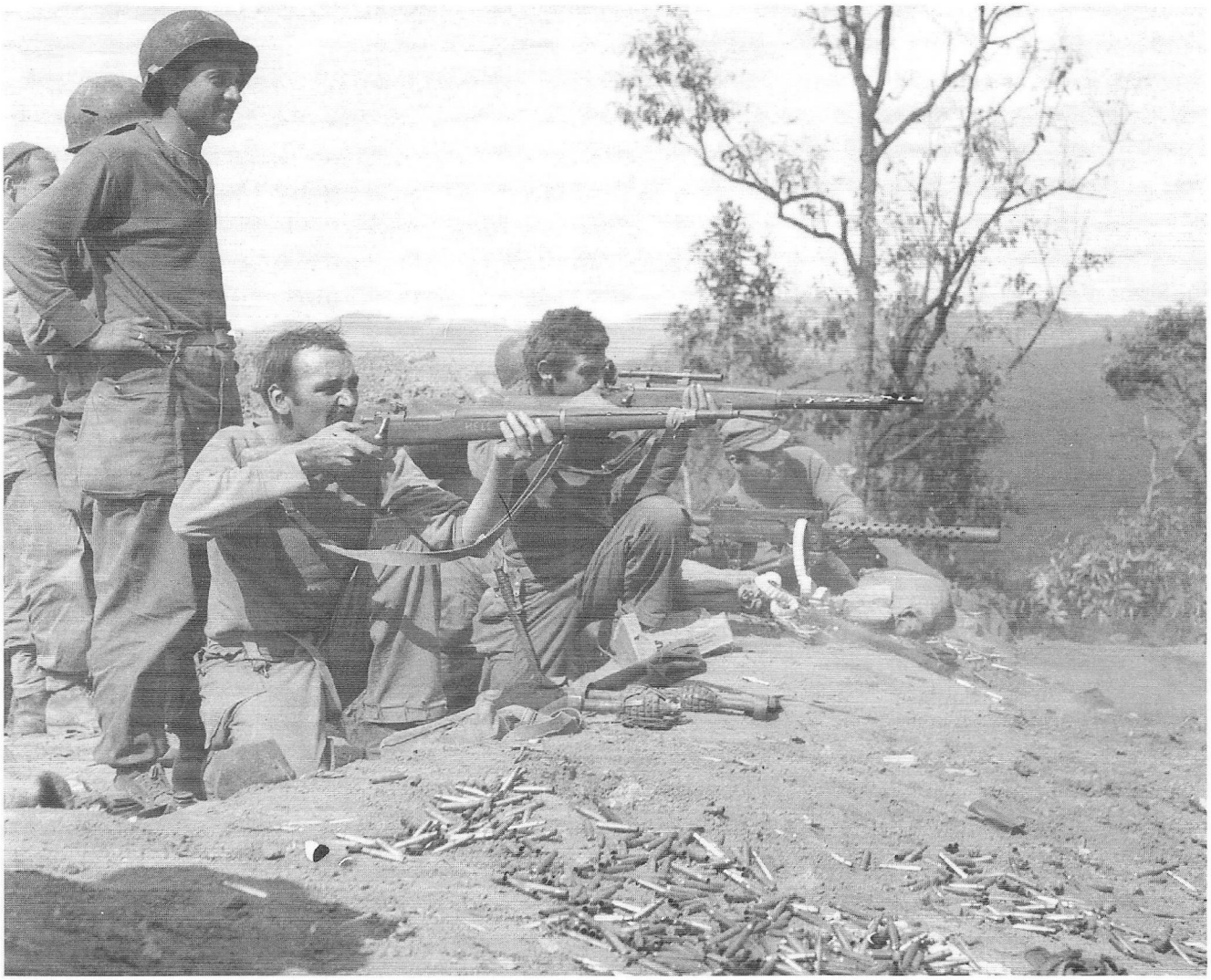
(center) M1903A3 barrel markings. A Smith-Corona barrel made in September of 1943 is shown to the left of a Remington Arms barrel produced in March of 1943.

(bottom) M1903A3 receiver markings. A Smith-Corona example is shown above a Remington.



Remington M1903A4 sniper rifle with Weaver M73B1 telescope. Based on the M1903A3 service rifle, the 'A4 was made in greater numbers than any other American sniper rifle.

Pfc. Edward J. Foley of the 143rd Infantry, 36th Division, cleaning his M1903A4 sniper rifle before moving out to the front lines near Velletri, Italy, May 29, 1944. It is interesting to note that even at this late date in the war, most of the soldiers shown in this photo are armed with M1903 rifles. (Peter Senich)



U.S. Army troops firing on the Japanese from a hilltop position in Burma, 1945. The soldier kneeling at the front is firing an M1903A3 rifle. The GI to his left has an M1903A4 sniper rifle with a Weaver scope. An M1919A4 .30 cal. air-cooled machine gun is also shown. Note also the fragmentation grenades on the ground. (Peter Senich)

American soldiers in France, August of 1944. The soldier in the center is holding an M1903A4 sniper rifle with the issue Weaver 330C/M73B1 scope. The GI behind him has an M1 Garand fitted with an M7 grenade launcher.

(U.S. Army)

(left) Close view of the M1903A4 receiver markings. The "03-A3" designation was retained so that any rifles proving insufficiently accurate for sniping use could easily be converted into service rifle configuration.

(below) Close view of M1903A4 receiver and the Weaver M73B1 telescope. Note the bolt handle modified to provide clearance for the scope body. The rifle is equipped with the Redfield "Junior" telescope mount.

could be easily converted into service rifle configuration in the event a specific rifle proved insufficiently accurate for sniping use. To this end, the standard "03-A3" marking was stamped on the receiver ring although, on original M1903A4 rifles, this marking was applied to the extreme left side of the ring so it could be read with the mount in place.

The M1903A4 proved to be somewhat of a disappointment as a sniping rifle. The use of commercial components not designed for the rigors of combat caused some problems. The chief cause for complaint was the Weaver telescope, which was found to be too delicate for normal service use. The lack of iron sights prevented the rifle from being used if the scope should become damaged, which, obviously, could seriously affect the utility of the weapon. Somewhat surprisingly, there is no evidence to indicate that Remington manufactured the M1903A4 sniper rifle with any higher degree of quality or with any more attention to accuracy than the standard M1903A3 service rifle. Although the '03A3's accuracy was quite acceptable for a military rifle, it was not up to the standards normally expected of a rifle used for such exacting duty as sniping. It is clear that a better sniper rifle based on the M1903A3 could have been fielded if special emphasis had been taken in the weapon's manufacture and if more durable and reliable components (such as the telescope) were utilized.

Although originally adopted as an interim measure until a sniping variant of the M1 could be developed, the M1903A4 was the only American sniper rifle to see mass production and widespread issue during World War Two with some 28,365 being produced. The majority of production went to the U.S. Army but some 'A4's were diverted to the Marine Corps. The Marine Corps report alluded to previously regarding infantry weapons in use by the Raiders on New Georgia Island stated the following about the '03 sniper rifle.

U.S. Rifle, Cal. .30, M1903 (snipers). Should be

substituted by the M1. The M1 is just as accurate, for any firing to be done in the jungle and has greater firepower.

The M1903A4 saw action in virtually every theater of the war. Despite its flaws, the M1903A4 gave reasonably good service within its limits. It was the standard United States sniping rifle of the war and saw limited use for many years afterward.

Other Variant M1903 Sniper Rifles

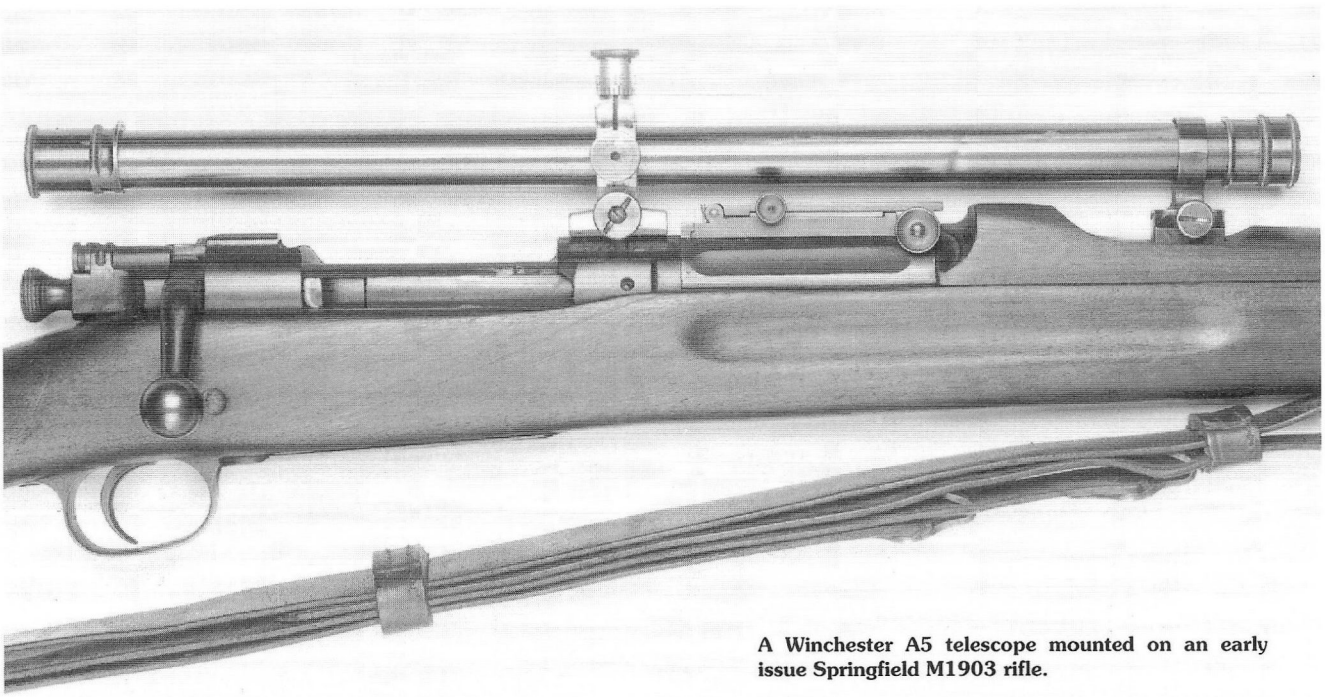
In addition to the M1903A4, two other types of '03 sniper rifles saw service during World War Two with the U.S. Marine Corps. Both of these weapons, unlike the 'A4, were not originally manufactured as sniping rifles but were converted from either standard issue or National Match '03s and were fielded in relatively small numbers.

USMC Springfield M1903/Winchester A5 (Lyman 5A)

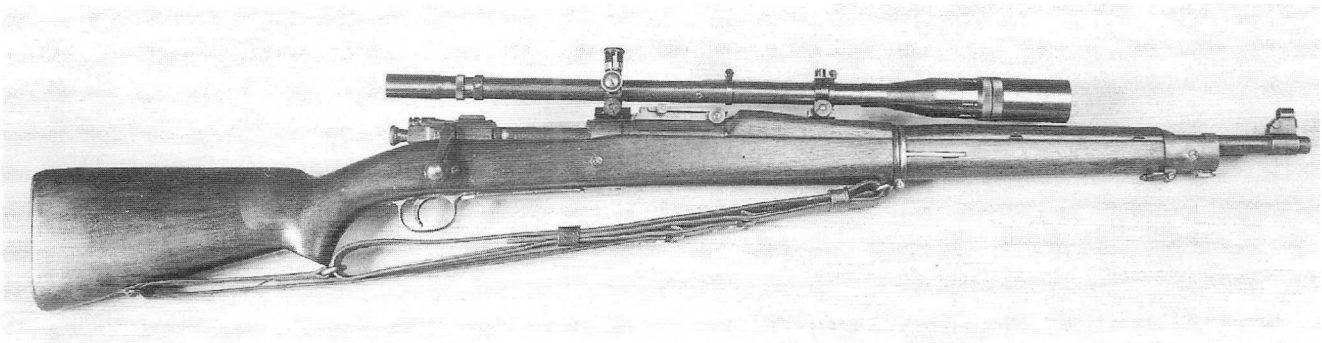
Prior to and during the First World War, a relatively small number of M1903 rifles were fitted with commercial production Winchester A5 telescopes by the Marine Corps. Most of these modified '03s were used by Marine rifle teams and a number were pressed into service during World War One as makeshift sniper rifles.

The M1903/A5 rifles were still in the Corps' inventory at the start of World War Two. Many of the older Winchester scopes had been replaced by this time with the Lyman 5A telescope, which was essentially an improved A5. The M1903/A5 (or 5A) sniper rifles were used to train Marine Scout-Snipers during World War Two, and some are documented as having seen combat service on Guadalcanal and other early Pacific campaigns.

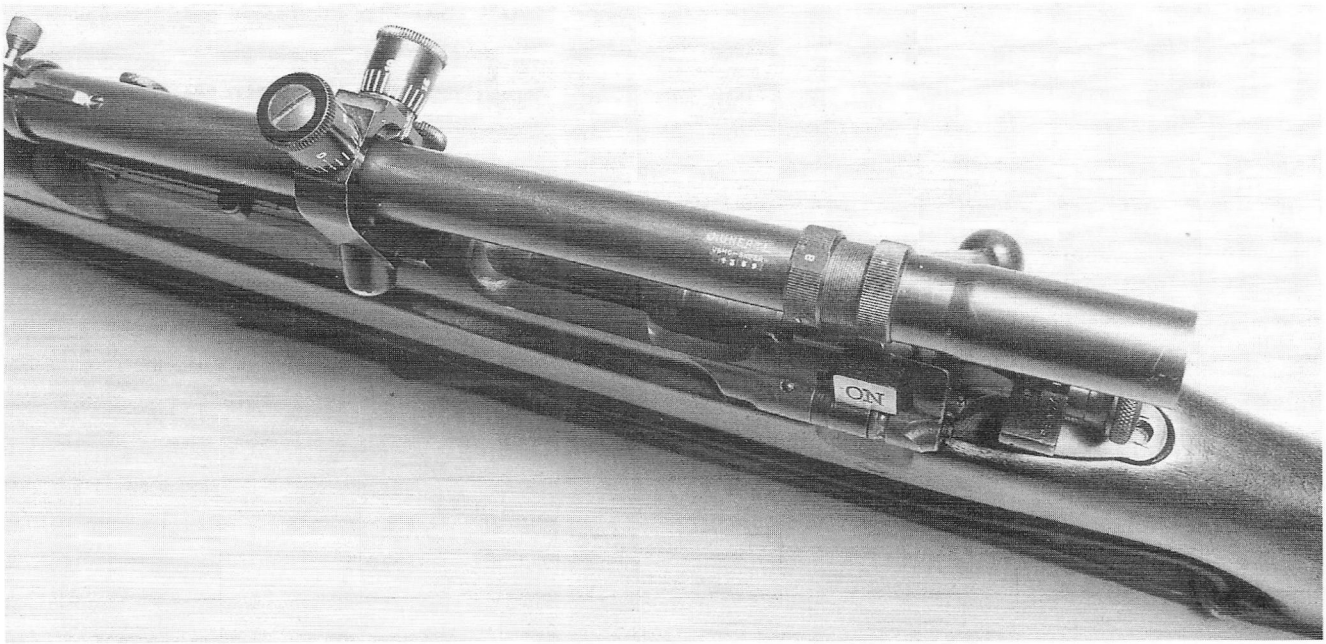
(above) A Marine on Guadalcanal, 1942, firing an M1903 rifle with an A5/5A telescope. (Peter Senich)



A Winchester A5 telescope mounted on an early issue Springfield M1903 rifle.



(above) USMC M1903A1 sniper rifle with Unertl telescope. This weapon was converted from existing M1903A1s, many of them National Match rifles, by Marine armorers.



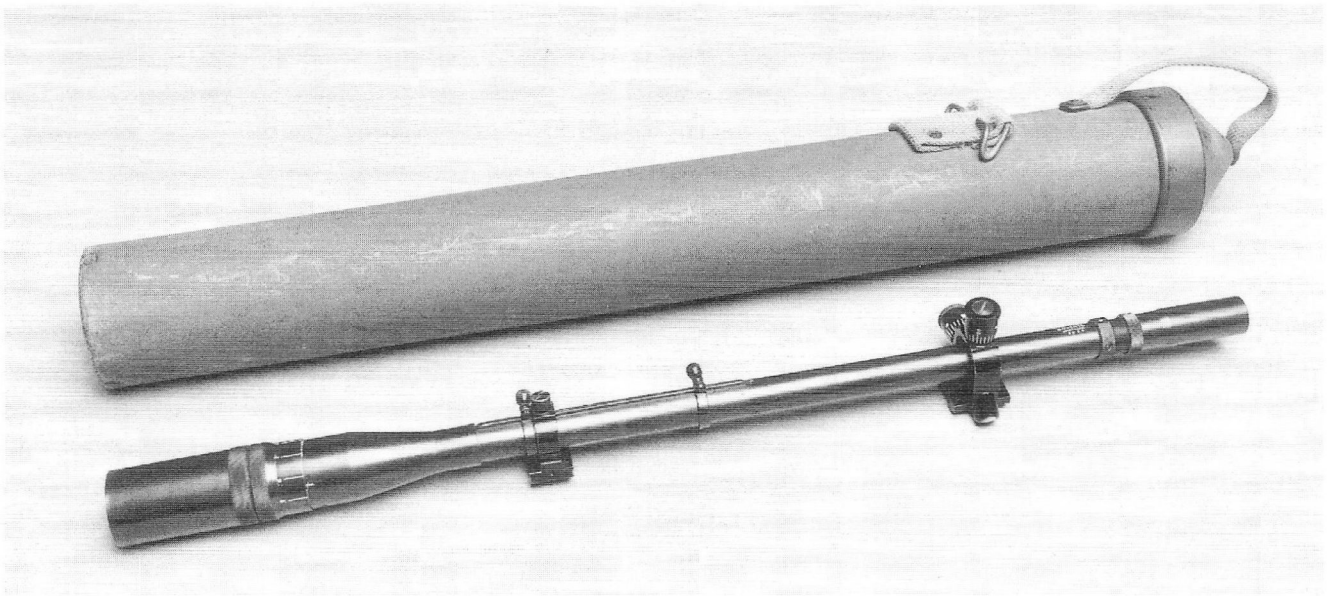
Top view of markings on the USMC Unertl telescope. All issue scopes were marked "USMC-Sniper" as seen on this example.

While not optimum military sniping weapons, these M1903/A5 rifles provided valuable service to the Marine Corps when no other sniper rifles were available during the bleak early days of the war.

USMC M1903A1/Unertl Sniper Rifle

While the 5A/A5 telescopes were satisfactory on the rifle range, they, like the Weaver scopes used on the M1903A4, were not ideal military optics. Clearly, an improved sniping rifle was needed by the Marine Corps. After some preliminary field testing of several types of rifles and telescopes, it was decided to procure a quantity of target type 8X telescopes and mounts from the firm of John Unertl Company. These scopes were to be mounted on M1903A1 rifles by Marine Armorers. Many of the early modified rifles were National Match rifles, but a number of standard issue M1903A1 rifles were believed to have been converted later in the war. The precise number of rifles modified by the Marine Corps into sniper rifles is not known but is not believed to have been extremely large, probably in the range of several thousand. Some writers have referred to these weapons as the M1941 or M1942 USMC Sniper Rifle, but this designation was not an official Marine Corps nomenclature; the government stopped using the year of a weapon's adoption as its model designation in the late 1920s. The Marine Corps generally referred to this weapon as an M1903A1 rifle and made specific reference to its Unertl telescope.

The M1903A1/Unertl sniper rifles began to be issued to the Marine Scout-Sniper teams sometime in either late 1942 or early 1943 and the weapons saw action in most of the later Pacific campaigns of the war. The dense jungle vegetation on some of the islands on which the Marines fought mitigated the use



The USMC Unertl sniper telescope and its micarta carrying can. This can was seldom used in the field due to its bulkiness.

Marine Scout-Snipers on Saipan firing M1903A1 sniper rifles fitted with USMC Unertl telescopes. These weapons proved to be the most effective American sniping rifles of World War II. (National Archives)

of scoped sniper rifles to some extent. However, on other islands with a lot of wide open terrain (Saipan and Okinawa), the M1903A1/Unertl rifles were used with great effectiveness.

A Marine sniper firing his M1903A1/Unertl rifle in the Pacific theater during WWII. The rifle has just been fired as the Unertl telescope is still in the forward position. (Peter Senich)

While not perfect, the M1903A1/Unertl sniping rig proved to be a deadly weapon in many applications and was undoubtedly the most effective American sniping rifle of the war. Its popularity was not universal with the Marine Corps, and the semiautomatic M1C sniper rifle was adopted to replace the Unertl-scoped Springfields at the end of World War Two. However, there was no known Marine Corps procurement of the M1C during World War Two and the '03A1/Unertl rifles also saw service in the hands of Marine Scout-Snipers during the Korean War.

The M1903 and M1903A1 service rifles remained in the government's inventory until July 24, 1947, when they were officially declared obsolete.

While it was supplanted during World War Two as our standard issue service rifle by the M1, the M1903 still played an important role in the conflict and further secured its place as one of the most famous rifles in American military history.

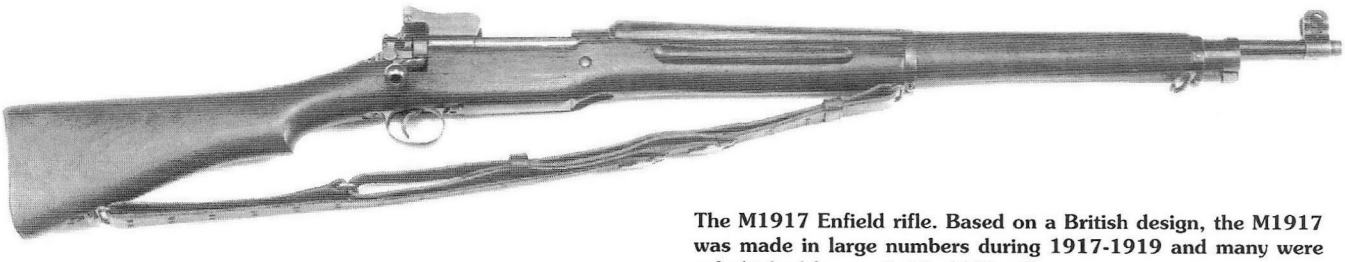
M1917 "Enfield"

As we discussed with the M1903 rifle, the United States was faced with a serious shortage of rifles during the bleak opening days of the Second World War. Fortunately, there was a source of slightly obsolete but thoroughly serviceable rifles available to the government. These rifles were the "U.S. Rifle, Caliber .30, Model of 1917," commonly known as the Enfield.

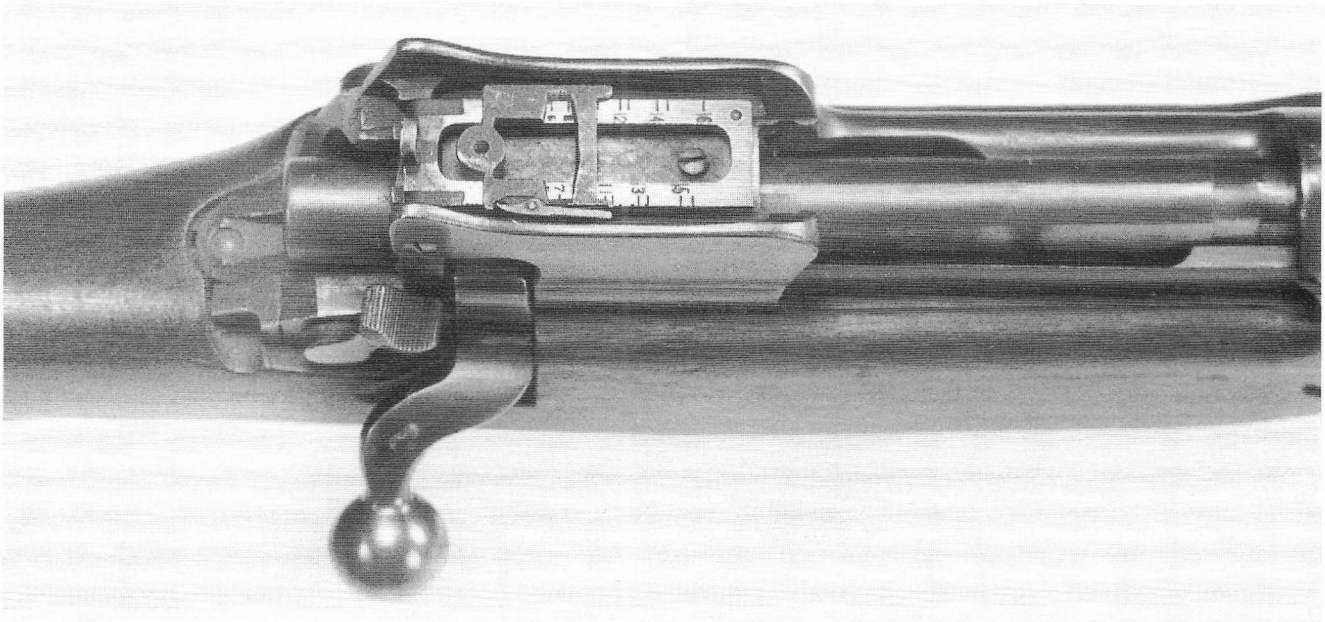
The M1917 rifle was a slight modification of a British design that had been manufactured under contract in the United States during World War One for Great Britain. Due to a pressing need for service rifles at the outbreak of the First World War, the Pattern 1914, a newly developed English rifle chambered for the British .303 cartridge, was produced by three American firms: Winchester, Remington and Eddystone. The United States entered World War One at about the time when the American firms were completing their British contracts for the P14. The Springfield Armory and Rock Island Arsenal could not meet the demand for rifles even with greatly expanded production schedules. It was decided to utilize the factories and trained work forces that had successfully manufactured the P14 to produce a version of the weapon chambered for the standard American M1906 (.30-06) cartridge. The slightly modified rifle was adopted as the Model of 1917, and some 2,422,529 were manufactured until production ceased in early 1919. By the time of the Armistice, the majority of the troops of the American Expeditionary Force (AEF) were armed with the M1917 rifle and not the M1903. The interesting story of the U.S. adoption and production of the M1917 rifle can be found in my book *Winchester in the Service.*

The M1917 proved to be a satisfactory and reliable weapon. It was a bit longer and bulkier than the M1903 and its sights were not capable of windage adjustment. However, for battle purposes, the M1917's sights were actually superior to the '03's sights. The Enfield was equal or superior to any of the rifles used by our allies or adversaries and compared very well overall to the '03 as a combat rifle.

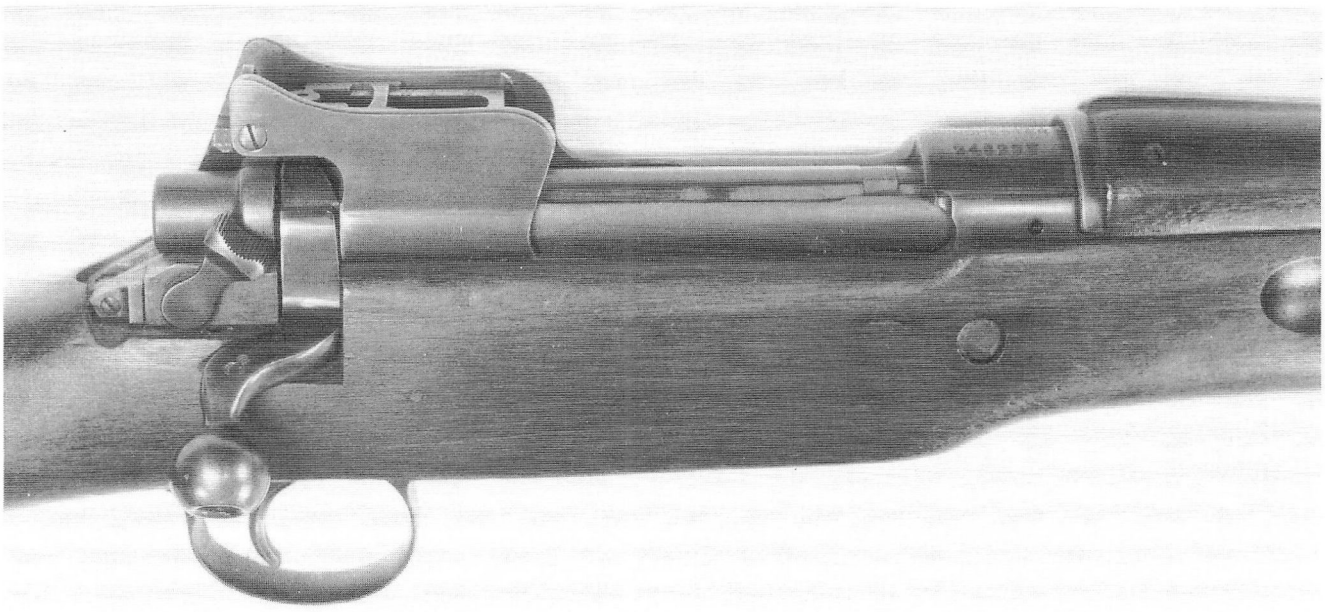
At the conclusion of World War One, some thought was given to standardizing the M1917 to replace the M1903 since more of the former were in inventory. However, for several reasons, including the '03's superiority as a match rifle, it was decided to retain the Springfield and retire the M1917 to the war reserve stockpile. Throughout the 1920s and 1930s the '03 was the only service rifle issued to the U.S. Army, Navy and Marine Corps. When England became involved in the Second World War and faced the threat of German invasion, many weapons were desperately needed to arm the hastily formed Home Guard units. Thousands of American military small arms, including large numbers of M1917 rifles, were dispatched to England under the Lend-Lease Program.



The M1917 Enfield rifle. Based on a British design, the M1917 was made in large numbers during 1917-1919 and many were refurbished for use in World War II.



The M1917 Enfield's rear sight. While not adjustable for windage, this was an excellent battle sight.



Receiver area of the M1917 rifle. Note the configuration of the bolt handle, the thumb operated safety and the protective "ears" on the rear sight.

A soldier sighting an M1917 rifle in the early days of World War Two. The Enfield's role in the Second World War is often overlooked today. (U.S. Army)

The U.S. M1917 rifles were issued to a number of the British Home Guard units and most were identified by having a red band painted around the upper part of the stock to indicate that the weapons were chambered for the .30-06 cartridge rather than the British .303. The fact that large numbers of Pattern 1914 rifles were also around at the time made such measures mandatory. Although the German invasion did not materialize, the American weapons nevertheless provided a much needed measure of security to the embattled British at a most desperate time.

Ordnance Department records indicate that many thousands of M1917 rifles were also supplied to the Commonwealth of the Philippines during the late 1930s at the request of General Douglas MacArthur.

In 1939, the War Department officially declared the M1917 rifle as Limited Standard. This meant that no more rifles of this type would be manufactured and that its continued use was authorized only if weapons classified as Standard (such as the M1903 and M1) were not available.

After Pearl Harbor, the United States military rapidly increased its rush to rearm. In order to meet the overwhelming demand for training rifles, most of the remaining M1917 Enfields were pulled from the reserve stockpile. Many of these rifles had been used during World War One and others had languished in storage for the past quarter century. Virtually all needed some cleaning, refurbishing and repair to be put back into acceptable condition for service. The Naval Supply Depot report from Norfolk, Virginia, quoted previously revealed that on February 14, 1942, the facility had seven M1917 rifles on hand in serviceable condition and 34 requiring overhaul.

One component frequently requiring replacement was the barrel. Since no M1917 barrels had been produced after 1919, it was necessary to procure some newly manufactured replacement barrels to be used in the government refurbishing programs. A procurement order for M1917 barrels was issued on September 8, 1942. Two firms, Johnson Automatics of Providence, Rhode Island, and High Standard of New Haven, Connecticut, were awarded contracts for the production of replacement M1917 barrels. Johnson Automatics was the same firm that produced the Model 1941 Johnson rifle and Light Machine Gun during World War Two. High Standard made the barrels under subcontract for Smith-Corona's M1903A3 rifles and produced a number of M1903 replacement barrels as well. High Standard manufactured a total of 61,250 M1917 barrels during World War Two and Johnson delivered some 81,571 during the same period. The final delivery of M1917 barrels to the government was in September of 1944. Unlike the original

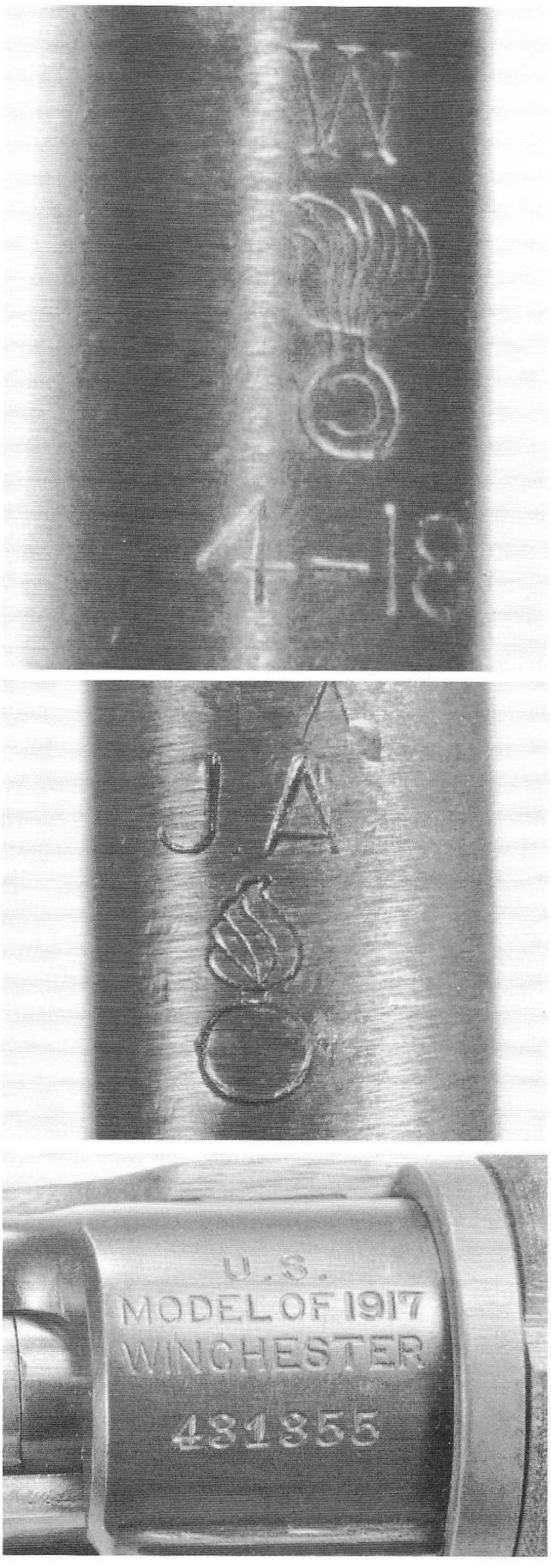
five groove left hand twist WWI-vintage M1917 barrels, the High Standard barrels were of the four groove variety with a right hand twist, while the Johnson M1917 barrels also had a right hand twist but were made with two grooves. Both companies stamped their initials on the barrels near the front sight in much the same manner as was done on the original WWI-production barrels.

It has been reported that some M1917 rifles of Eddystone manufacture suffered cracked receivers when they were rebarrelled during World War Two. This problem does not appear to have been extremely widespread but a rebuilt Eddystone M1917, especially with one of the Second World War replacement barrels, should be examined closely before the weapon is fired.

The re-issued M1917 rifles saw much use as training arms during World War Two and many new recruits were introduced to the manual of arms and close order drill with these weapons. Some M1917 rifles were issued to U.S. Army troops overseas early in the war, and a number of M1917 rifles were carried by field artillerymen during the North Africa campaign. However, actual front line combat use of the Enfield during World War Two was very limited.

A rifle grenade launcher was developed and adopted (the M2) for the rifle and was manufactured in some quantity. The majority of these launchers are reported to have been intended for use with the Lend-Lease M1917s sent to England. It does appear that some M1917s equipped with grenade launchers were fielded for combat service with American troops during the war, but such use was undoubtedly quite limited. The M2 grenade launcher is covered later in the rifle launcher segment of this book.

While the M1917 saw little use as a front line combat rifle during World War Two, its availability allowed thousands of M1903 and M1 rifles, which would oth-



Right hand column:

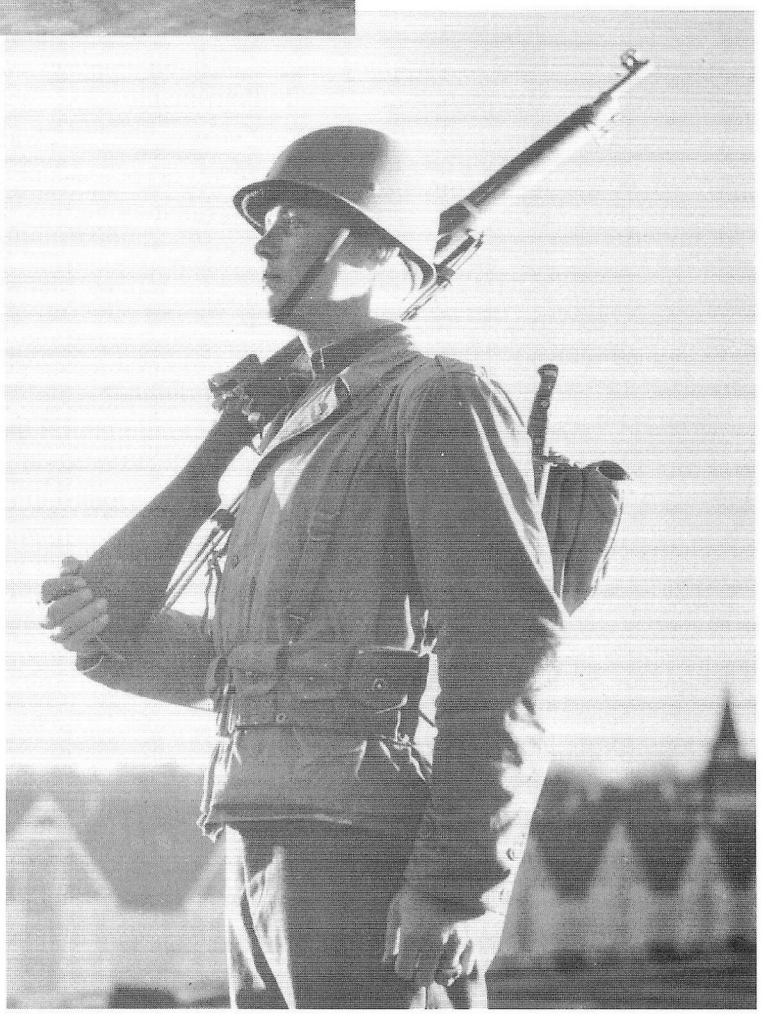
(top) M1917 barrel markings. The first initial ("W", "R" or "E") was stamped just behind the front sight over the Ordnance Department flaming bomb marking and the month and year that the barrel was made. This example was produced by Winchester in April of 1918.

(center) Markings found on an M1917 Enfield rifle barrel made by Johnson Automatics during World War II. These barrels were used to refurbish many World War I-vintage M1917 rifles for use in the Second World War.

(bottom) Typical M1917 rifle receiver markings. This example was manufactured by Winchester. Remington and Eddystone also produced the M1917 rifle during the First World War.

(left) A unit of the Delaware State Guard training with M1917 rifles in October of 1941. Many soldiers entering the service during World War Two trained with M1917 rifles. (Delaware State Archives/V for Victory)

(below) A World War II GI shouldering his M1917 Enfield. Note the M1917 bayonet on the pack behind his left shoulder. While no M1917 rifles were made after 1919, large numbers saw service during World War II as training arms. (U.S. Army)



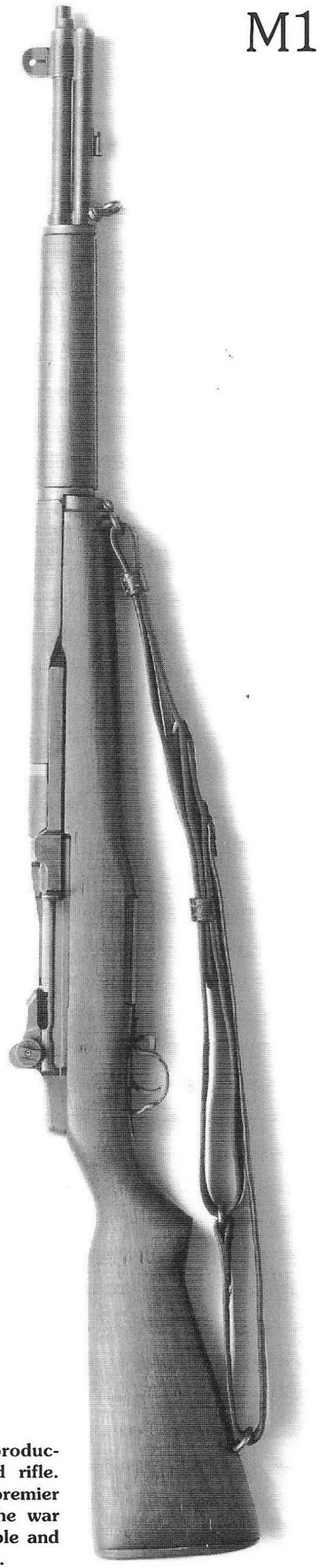
erwise have been needed for training purposes, to be released for combat duty. In addition to the rifles sent to England for Home Guard use, large numbers of Enfields were supplied to some of our other allies, including China. The Chinese made extensive use of their M1917 rifles and many have been re-imported back into the United States during the past few years. As with most of the re-imports of other types, the former Chinese-issued Enfields are almost always found in poor condition today.

The M1917 Enfields were gradually withdrawn from service as the supply of M1903 and M1 rifles began to catch up with the demand. An Ordnance Department committee recommended as early as November of 1944 that the M1917 rifle be declared as Obsolete, but approval for this change was not forthcoming by the War Department. The official reason for the disapproval was given as

...in view of the possibility that "the rifle" will be the subject of assignment by the Munition Assignment Committee (ground) to meet International Aid requirements, the recommendation...cannot be favorably considered at this time. The present classification, namely Limited Standard, remains in force.

The M1917 rifle was officially declared as Obsolete on October 3, 1945. Soon afterward, most of the M1917 rifles in the government's inventory were sold through the auspices of the Department of Civilian Marksmanship (DCM). Long time readers of the *American Rifleman* magazine will undoubtedly recall advertisements for these rifles, which sold at very attractive prices and were popular at the time for sporterizing.

M1 Garand Rifle



World War II-production M1 Garand rifle. This was the premier battle rifle of the war and was a reliable and effective weapon.

The American military rifle most closely associated with World War Two is undoubtedly the M1. Popularly known as the "Garand" after its inventor, John C. Garand, the "U.S. Rifle, Caliber .30, M1" was the product of development and experimentation conducted at the Springfield Armory during the 1920s and 1930s. The general configuration of the rifle went through several design changes during this period. These included a change from primer to gas operation and the substitution of the standard .30-06 cartridge for the .276 caliber round originally conceived for use with the weapon. The M1 was adopted on January 9, 1936. Eighty pre-production Model Shop rifles were fabricated at the Springfield Armory for evaluation, and to assist in setting up the facility for mass production of the weapon. John Garand designed the rifle so it could be efficiently mass produced, and he placed special emphasis on easy take down for cleaning in the field.

The first production M1 rifles came off the Springfield production line in late 1937 and limited numbers were manufactured for the next couple of years. The M1 as originally adopted and manufactured utilized a gas system which trapped the escaping gas at the end of the muzzle which was used to operate the mechanism.

In early 1940, this system was changed to a type which used a port drilled in the barrel to take off the necessary gas. This change increased the rifle's reliability and made for a better combat weapon. The later type of gas system was used on all M1s from early 1940 through the end of production in 1957. Even though these early pattern M1 rifles are not generally thought of as World War Two weapons, some were actually used in combat during the opening days of the war, particularly in the Philippines. The rifles issued earlier were not specifically recalled to convert them to the later type of gas system but were converted when they were brought in for maintenance or rebuild through normal ordnance channels. Virtually all of these early rifles were subsequently converted and original surviving specimens are quite rare.

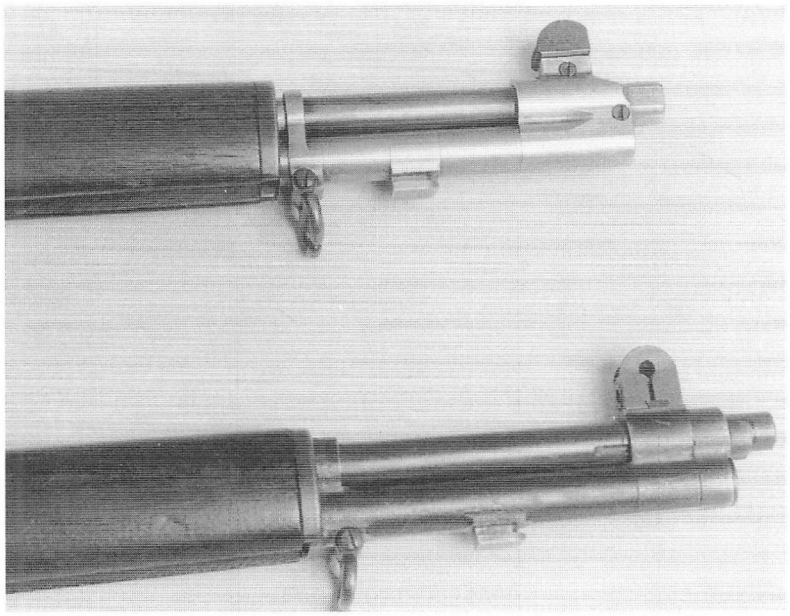
Prior to Pearl Harbor, even though the United States was in the process of building up its military arsenal, thousands of weapons, including sizeable numbers of the latest M1 rifles, were sent to Great Britain under the Lend-Lease program.

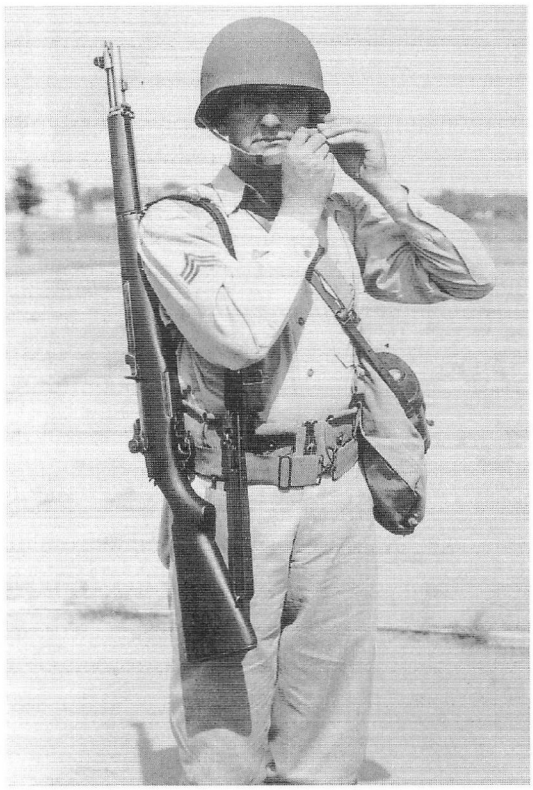
During World War Two, the M1 was manufactured by the government owned and operated Springfield

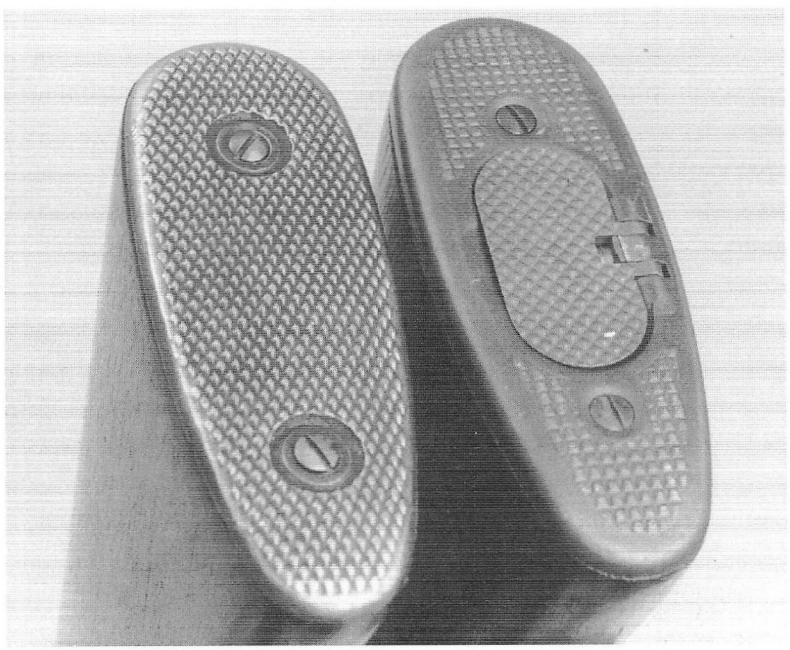
(right) Comparison of early gas trap (top) and later spline type M1 gas cylinders. The early rifles had 22" barrels while the later versions had 24" barrels. The early gas trap rifles were converted to the later specifications as they were rebuilt and surviving original specimens are very rare.

(below) GI with an early production gas trap M1 rifle. This is significant in that the soldier is wearing the M1 helmet, which was standardized on June 9, 1941 but not issued in quantity until early 1942. This confirms the fact that, contrary to several sources, a number of the early unaltered M1 rifles did, indeed, see combat use during WWII. (U.S. Army)

(bottom, right) Solid buttplate as found on M1 rifles made prior to mid-1941 shown to the left of a later buttplate with hinged trap as seen on the balance of production M1s.



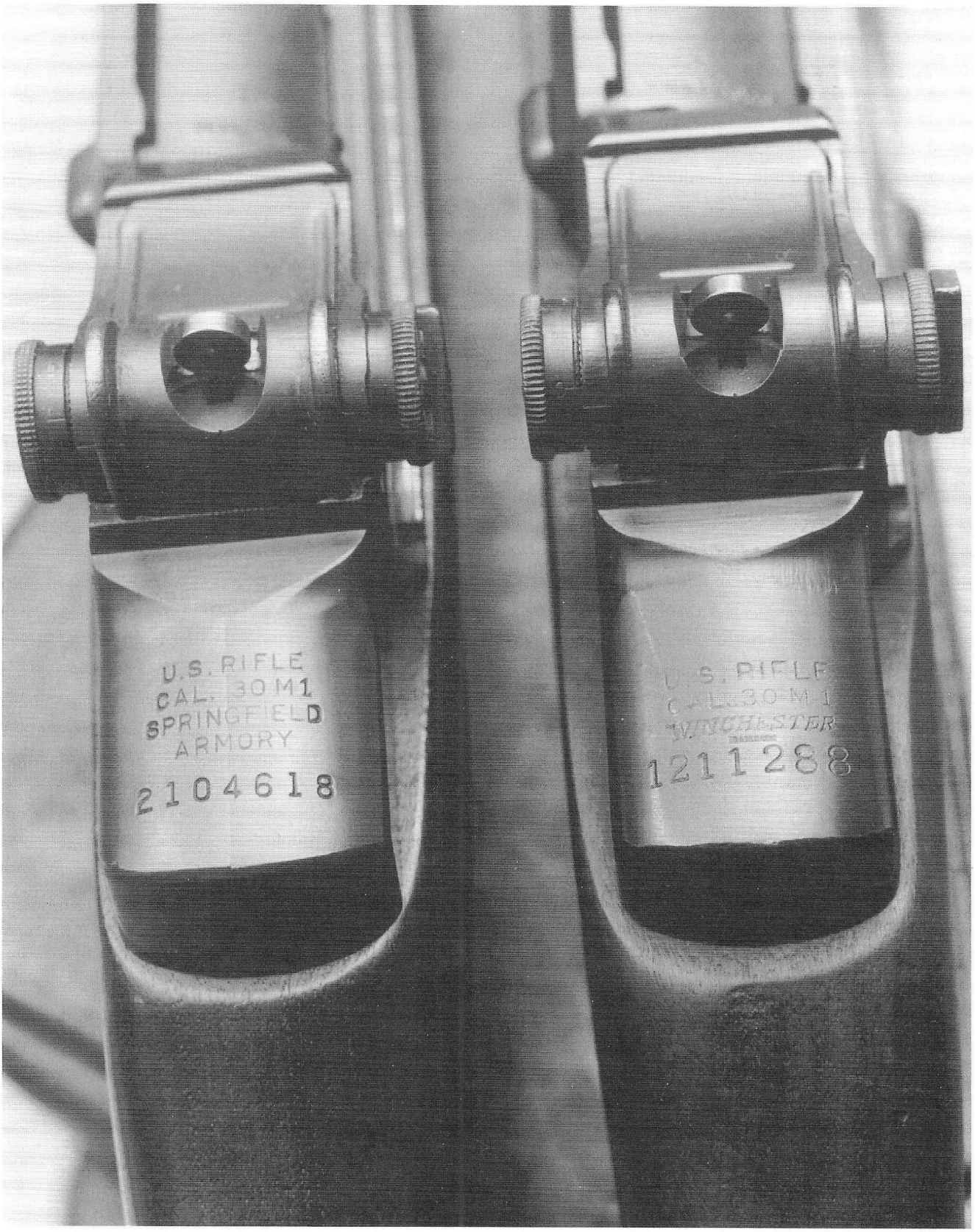




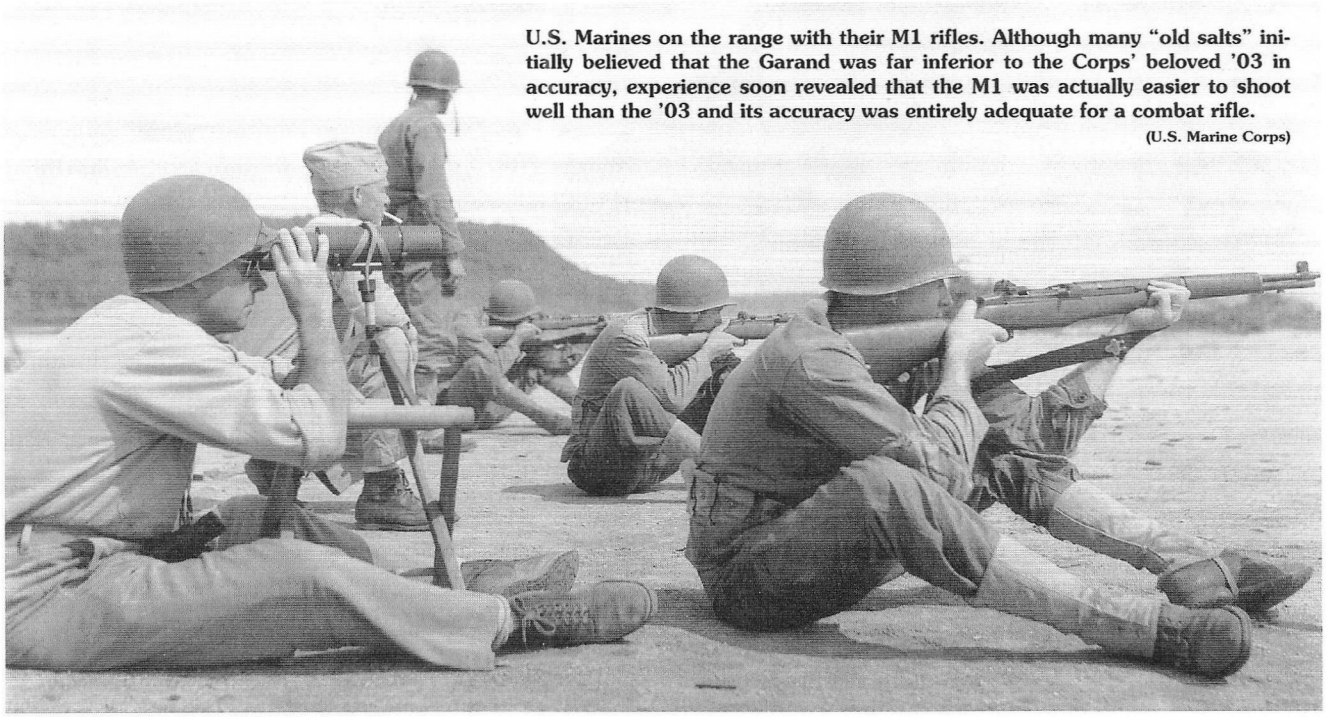
Armory and the civilian firm of the Winchester Repeating Arms Company. Springfield made the M1 from the time of its adoption until production ceased in 1957. Winchester received an Educational Order for a relatively small quantity of Garand rifles on April 4, 1939. The company was awarded a number of additional contracts to produce the weapon during the war and the firm eventually made a total of some 513,880 M1s before the company stopped production in 1945. Winchester's M1 production is covered thoroughly in my book *Winchester in the Service.*

By the end of the war, some 4,028,375 M1 rifles had been produced by Springfield and Winchester. However, the rifle was often in short supply by our armed forces until well into 1943. As stated, the M1903 rifle helped to fill the void until sufficient numbers of Garands became available. Although the M1903 was widely used throughout World War Two, the M1 was the primary service rifle. In his *Book of the Garand,* Maj. General Julian S. Hatcher makes an interesting comparison between the '03 and the M1 when he states that "....it is estimated that during World War II more shots were fired with the Garand than were ever fired with the Springfield in all its history."

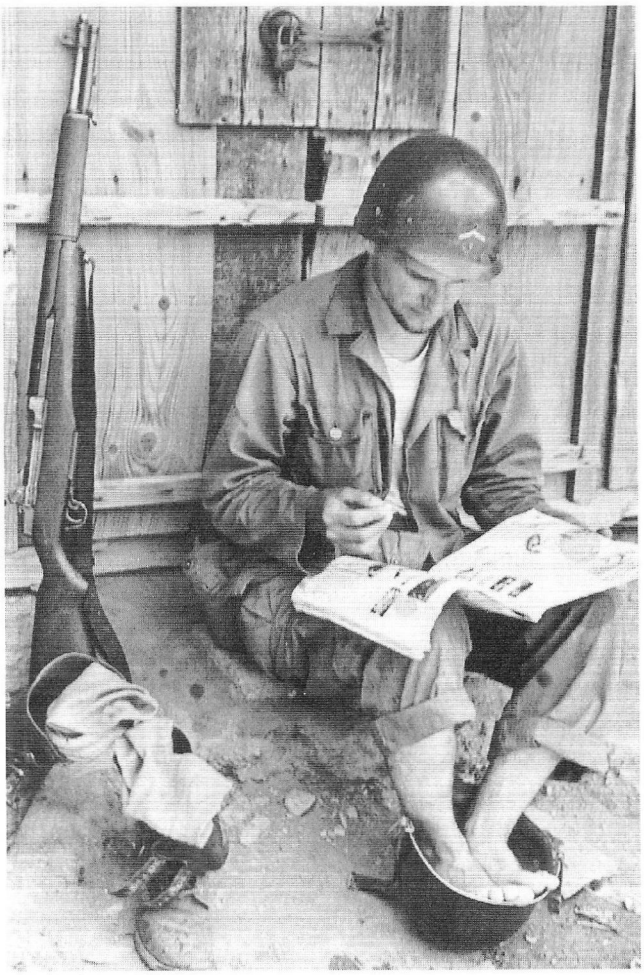
Although the M1 proved to be a superb weapon,



World War II M1 receivers.
(left) Example made by Springfield Armory in November of 1943.
(right) Winchester M1 receiver made in July of 1942.



U.S. Marines on the range with their M1 rifles. Although many "old salts" initially believed that the Garand was far inferior to the Corps' beloved '03 in accuracy, experience soon revealed that the M1 was actually easier to shoot well than the '03 and its accuracy was entirely adequate for a combat rifle. (U.S. Marine Corps)



This photo speaks volumes about the day-to-day drudgery of the average GI during World War II. Even while taking a break, this soldier has his M1 rifle close at hand. Note the locking bar rear sight and the stamped trigger guard. (U.S. Army/Jim Enos)

many pre-war veterans were a bit skeptical of the rifle when it first appeared on the scene. Semiautomatic military rifles were still somewhat of a novelty in the late '30s and early '40s, and the M1's reliability and accuracy were often questioned. The M1 rifle had its share of developmental "teething problems" that had to be identified and corrected. These were eventually solved, but the early problems led to some lingering negative perceptions about the rifle. As related by Geoffrey Perret in his book, *There's A War to be Won....The United States Army in World War II,* regarding the early problems encountered with the Garand rifle,

The remaining bugs were worked out one by one. All the while, however, rumors were spreading among the infantry, encouraged by NCOs, that the new rifle wasn't worth a damn. The reason why NCOs disparaged the new rifle was that it had brought with it a more difficult marksmanship course that made it harder to qualify as an expert rifleman. An expert rating was worth five dollars a month. To a sergeant making thirty dollars a month, that was worth getting upset about. A lot of NCOs, fearing for their five dollars a month, bad-mouthed the new rifle rather than try to get used to it.

Hatcher confirms the initial cool reception of the Garand rifle in a brief narrative by Brigadier General Sidney R. Hinds.

When in 1941 we were first issued the U.S. rifle, .30 M1 Garand it was a gift from "Uncle"

(left) Pfc. Frank Vukasin, Company C, 331st Infantry Regiment, 83rd Division, reloading his M1 rifle near Houffalize, Belgium, during the Battle of the Bulge. Note the dead Germans in front of his position. (U.S. Army)

(right) World War II GI talking on a field telephone. His M1 Garand has the typical World War II locking bar rear sight and a milled trigger guard.

(U.S. Army)

received by most of us with varying emotions, attitudes and conjectures. The old soldiers, most Experts and Sharpshooters with the Springfield, said very frankly, "It's no good." "You'll never hit the broad side of a barn." "It will jam." "Whoever heard of cleaning a gun from the muzzle end?" "A recruit can never learn to take it down." "You'll shoot up all the ammo in the first five minutes." "You can't do a decent man'l at all." And so on, far into the night.

No piece of soldier's equipment has ever evoked so much really serious pro and con (mostly the latter) discussion among the using echelon in the history of the Army. The Garand, in spite of the fine technical data and propaganda from "top side", had to be sold to the foot soldier on the ground and to really prove itself in the hard and bloody usage of battle. Our old soldiers are not easy to sell anything new, and the acid test of battle was yet to come.

The Johnson rifle, commercially developed by a Marine Corps officer, came on the scene at about the same time that the M1 was experiencing its early problems. Many people were of the opinion that the Johnson was superior to the Garand and subsequent events led to a Congressional investigation that was clearly and firmly decided in favor of the M1.

Despite the somewhat rocky start, the M1 soon became a very popular rifle, especially among combat troops. Its virtues quickly became apparent and the demand for the weapon increased with its proven effectiveness. U.S. Army Lt. Col. John George relates the following in his book, *Shots Fired in Anger,* regarding early combat use of the M1.

...By the time we landed (on Guadalcanal) we had to keep ours (M1s) tied down by wire. Leather-

necks were appropriating all they could lay their hands upon by "moonlight requisition". In daylight, they would come over to our areas to barter souvenirs with freshly landed doughboy units; any crooked supply sergeant who had an extra M1 could get all the loot he wanted.

When the Marines began to get a few Garands up to the front the demand proportionately increased. They quickly learned that the M1 did not jam any more often than the Springfield, and that it was equally easy to maintain. The disassembly system, especially, made the M1 much easier to clean and oil.

Hatcher correctly pointed out that "The increased fire power (of the M1) became accepted as normal as even the former diehards forgot how slow and laborious it was to work the bolt of the old rifle under difficult conditions."

The M1's first significant combat use was in the ill-fated battles in the Philippines on Corregidor and Bataan, where early versions of the M1 were used with great effectiveness even though our troops were crippled by inadequate ammunition supplies. In a February 20, 1942, cablegram to General Marshall, General MacArthur stated

Garand rifles giving superior service to Springfield, no mechanical defects reported or stoppages due to dust and dirt from foxhole use. Good gun oil required as lubricant to prevent gumming, but have been used in foxhole fighting day and night for a week without cleaning and lubricating. All these weapons are excellent ones even without any modifications such as suggested.

The Marine Corps officially adopted the M1 in late 1941. A memorandum from the Ordnance Department to the Navy Department Bureau of Ordnance dated November 5, 1941, stated

Attention is invited to the substitution of U.S. Rifle, Cal. .30, M1 for the M1903 Rifle, as the M1 Rifle is now the standard rifle.

An American soldier occupying a well-prepared defensive position in a German forest late in World War II. Note his M1 rifle placed between two sets of forked sticks and the other M1 rifle to his right. (U.S. Army)

(above) Soldiers of the 75th Infantry Division firing on Germans, January 7, 1945, during the Battle of the Bulge. (U.S. Army)

(right) American troops on the move during WWII. The problem of the finish wearing off on the M1's gas cylinder and exposing a shiny surface is evident in this photo. It appears as if the soldier at the front has wrapped his rifle's gas cylinder with some sort of material to camouflage its bright surface. (U.S. Army)

A Marine Corps report on infantry weapons dated September 23, 1943, stated the following about the M1 rifle.

Turned in an excellent performance, and held up very well under all conditions...

Although supplies of the M1 remained somewhat limited in the early years of the war, most U.S. Army combat soldiers were armed with Garands throughout World War Two, although some shortages were experienced until well into 1943.

The Marine Corps did not receive sufficient Garands to totally meet its needs until sometime after the Army was more or less fully equipped with the rifle. By early to mid-1945, production contracts began to be scaled back as adequate numbers of rifles were in the hands of our troops overseas and in stateside training commands.

M1 Sniper Rifles

As previously discussed, some difficulty was encountered in developing a sniping version of the M1 and the bolt action M1903A4 rifle was adopted as an interim measure. The Garand's top loading and ejecting system effectively ruled out the conventional method of mounting a telescope directly on top of the receiver. Some experimentation was done with a prismatic scope that had an offset tube, but this was rejected after a brief testing period.

M1C

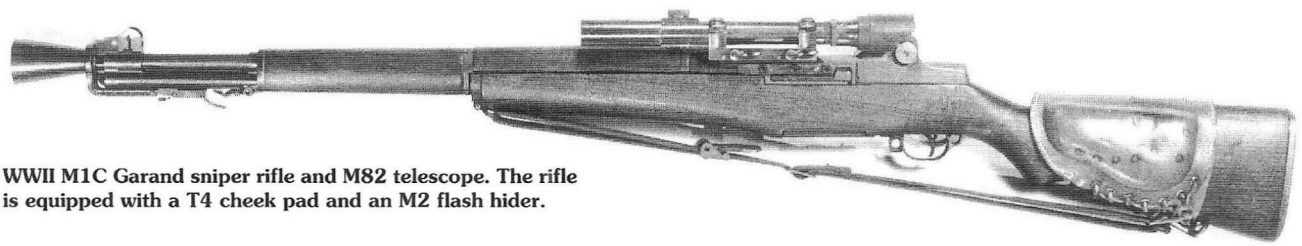
It was determined that it would be necessary to offset the telescope to the left of the receiver so that the rifle could be loaded and fired normally. After some testing, a commercial-type telescope base and mount designed and manufactured by Griffin & Howe (G&H) was selected. The G&H system had been used on commercial sporting rifles for a number of years and was a strong and effective design. The base was attached to the standard M1 receiver by three screws. The only modification required was the drilling of five holes in the left side of the receiver for the three screws plus two taper pins which held the base in alignment while the screws were tightened. The G&H scope mount dovetailed into the base and could be quickly removed without seriously affecting the zero of the scope. The Lyman Alaskan telescope (originally given the military designation of M73) was selected for use and was later standardized as the M81 (cross hair reticle) and the M82 (tapered post reticle). The modified rifle was given the designation M1E7. It was standardized as the M1C in June of 1944 and production got underway at the Springfield Armory in late 1944

and continued until the closing days of the war. Just under 8,000 M1C rifles were manufactured during this time.

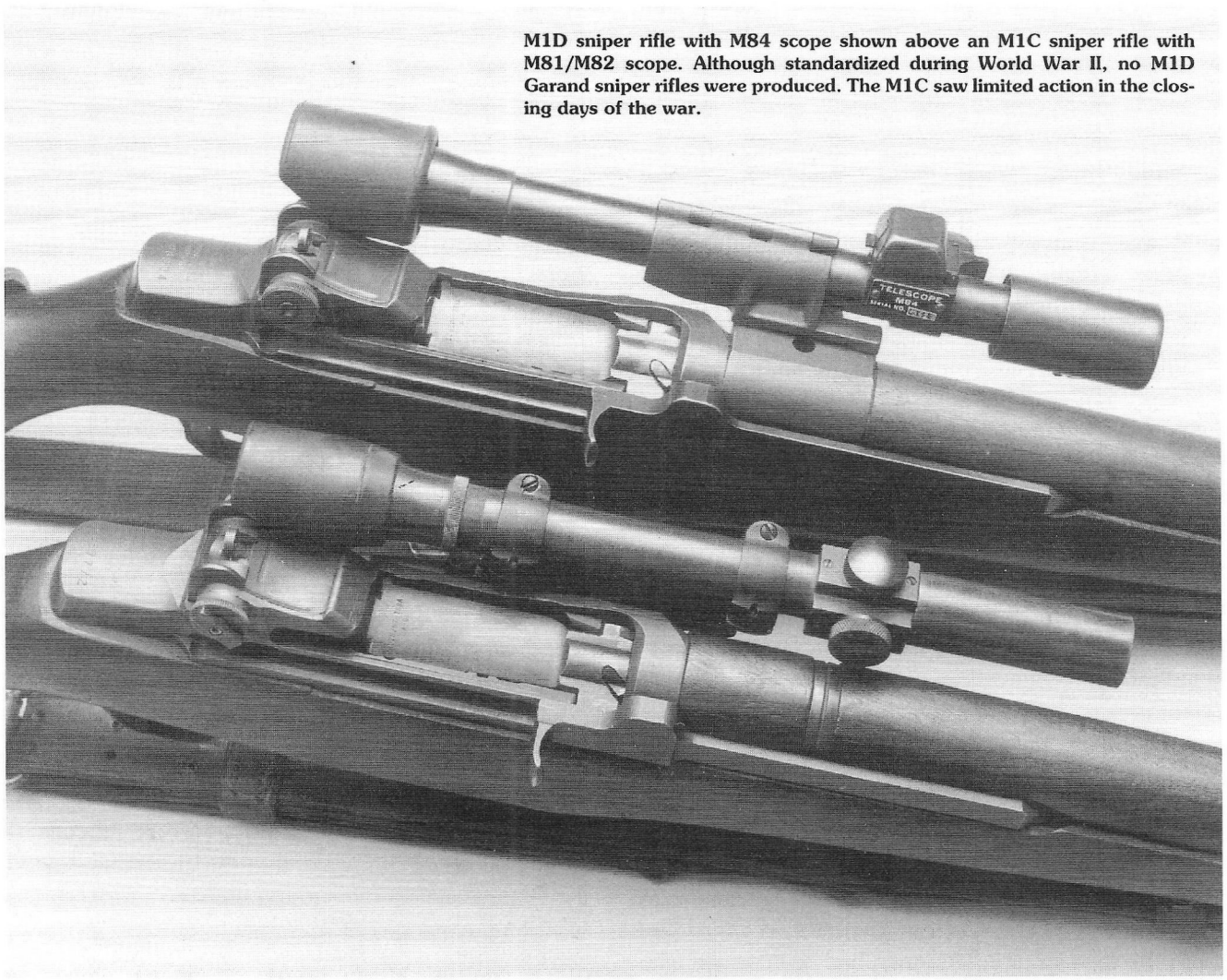
No M1C rifles were known to have been sent to Europe since the war ended in that theater before the weapon could be fielded. A few M1Cs arrived in the Pacific before the conclusion of hostilities, but these saw very limited use by the U.S. Army. Marine Corps documents in the National Archives reveal that the preliminary USMC testing of the M1C concluded on August 2, 1945. Obviously, since the war ended only a few days later, the Marines did not field any M1Cs during World War Two, but the weapon later saw use during the Korean War.

M1D

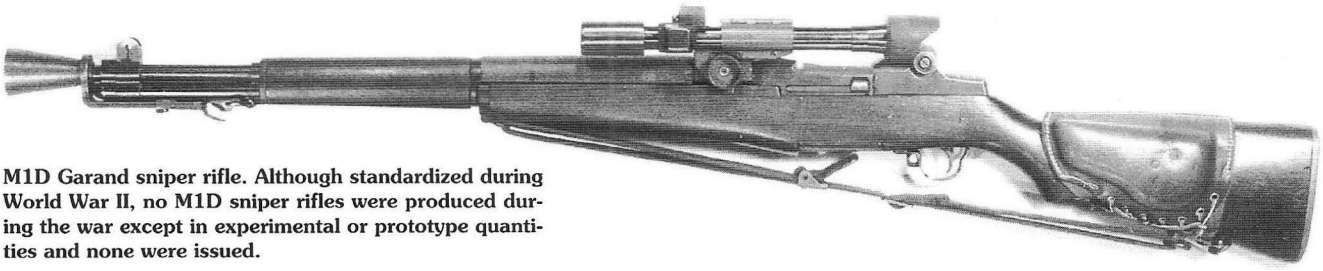
Although the M1E7 (M1C) was an acceptable sniper rifle, the Ordnance Department was interested in evaluating a design that did not require any modification of the basic M1 receiver. Another consideration was the fact that the government was uncertain if Griffin & Howe would be able to supply the required number of mounts. In order to hedge its bets, the Ordnance Department directed John Garand to develop



WWII M1C Garand sniper rifle and M82 telescope. The rifle is equipped with a T4 cheek pad and an M2 flash hider.



M1D sniper rifle with M84 scope shown above an M1C sniper rifle with M81/M82 scope. Although standardized during World War II, no M1D Garand sniper rifles were produced. The M1C saw limited action in the closing days of the war.



M1D Garand sniper rifle. Although standardized during World War II, no M1D sniper rifles were produced during the war except in experimental or prototype quantities and none were issued.

an alternative to the M1C design. Garand came up with a design which featured a mounting block permanently attached to the rear portion of the M1's barrel. This design was given the designation M1E8. Although the method of attachment was entirely different than that of the M1E7, the barrel mounted base allowed for easy removal of the scope from the rifle. The M81 and M82 telescopes were authorized for the M1E8 as well.

Although production of the M1C was underway, the M1E8 was adopted as the M1D and given the designation of "Substitute Standard". This was done so as to have another Garand sniper design ready for production should the need arise or if G&H was unable to supply the required number of mounts. Except for a few prototype or experimental specimens made, the M1D was not produced during World War Two and would not properly be considered as a Second World War infantry weapon. Relatively large numbers of standard M1 rifles were converted into M1D configuration by the military during the early 1950s and the weapon still remains in limited use by some National Guard units today.

The M1C was the only Garand sniper variant to see production or use during World War Two, albeit in very limited numbers. Original surviving examples are rare, and many fakes will be encountered. The Collector Notes section will give some details on recognizing original M1C rifles to assist someone in evaluating such a weapon. Despite the M1C's limited use during World War Two, it nevertheless is a very interesting and desirable weapon and would be a fine addition to a collection.

The United States was the only nation involved in World War Two that fielded a semiautomatic rifle in any appreciable numbers. This fact gave American troops a distinct advantage in a great many combat encounters during the war. The firepower and reliability of the Garand rifle saved many of our soldiers' lives and took a greater toll of our enemy than would had been the case if our infantrymen had been armed with the typical bolt action rifle as used by both our allies and adversaries. Other nations used some semiautomatic service rifles very sparingly, but these did not have any significant impact. The Soviet Tokarev and the German G41 and G43 semiautomatic rifles were not in the same league as the M1 Garand and only a few saw use during the war.

Despite the M1's outstanding record of service during the war, the rifle was not without its faults. Some of these early problems such as the infamous "Seventh Round Stoppage" and the adoption of the improved gas system were taken care of before widespread issue of the Garand had taken place. Other problems took longer to solve, if they were solved at all. For example, the rifle's en bloc clip-loading system came in for its share of criticism. These complaints are aptly summed up by Hatcher.

The clip, as it is now designed, is a waster of ammunition. When one, two or three rounds have been fired, the user naturally wants to replenish his magazine so that he will have the full eight rounds ready for the next target, or perhaps for a Banzai charge. But after one or more shots have been fired, it is so difficult to reload that the remaining four, five or six rounds are invariably fired at once, and a fresh clip is inserted. Such excessive firing wastes ammunition, and discloses positions, especially at night. The Garand clip-loading system should be replaced by a magazine similar to the one on the BAR or the carbine.

One of the design features of the Johnson rifle that found favor with its supporters was its rotary magazine, which could be easily and quickly topped off. The M1's successor, the M14, was equipped with a detachable box magazine.

Another frequently lodged complaint against the Garand was its weight of almost 10 pounds, about a pound and a half more than the M1903 Springfield. It should be noted, however, that the complaints about the Garand's weight decreased proportionally with the weapon's employment in combat. Troops having to carry the rifle on training marches or in non-combat-

ant roles frequently groused about its weight. On the other hand, soldiers using the M1 in front line combat situations rarely complained unduly about how much the rifle weighed. Actually, the rifle's weight was not excessive for a full power service rifle and helped dampen the weapon's recoil a bit.

One vexing problem with the Garand that was never totally solved was the tendency of its action to freeze under certain conditions of prolonged exposure to rain. However, a special lubricant (Lubriplate) was developed and issued that assisted greatly in reducing the problem. Small containers of the grease could be carried in the rifle's butt trap. When applied to the camming surfaces of the bolt, the problem was substantially lessened and the rifle's overall effectiveness was not severely hampered.

Another recurring problem was the finish on the gas cylinder. Since this item was made from stainless steel, it could not be blued or parkerized and a paint-like coating was applied. This did not prove to be very durable as it quickly wore off under adverse conditions and exposed a shiny gas cylinder which, obviously, wasn't a desirable feature in a combat rifle. The formulation of the coating was improved which helped a great deal although the problem was never totally eliminated.

The original rear sight of the M1 would not hold its adjustments very well. By mid to late 1942, a locking bar which could be tightened after adjustment was adopted. Just before the end of World War Two, an improved rear sight (the T105) was standardized, which eliminated the need for the added locking bar. This sight was used on post-WWII M1s.

While the above criticisms had some merit, other complaints were somewhat off the mark. For example, some people complained about the propensity of the rifle to inflict on its user, the so-called M1 Thumb. This situation occurs when someone presses down on the follower to release the bolt and does not remove his thumb in time and the bolt slams forward on the wayward digit. This slightly painful ailment is a result of carelessness or ignorance and is apt punishment for someone playing around with a weapon when not properly trained. Another ridiculous rap against the M1 was the alleged defect of the distinctive pinging noise caused by the ejection of the M1's empty clip after the last round has been fired. It has been suggested that some American soldiers were killed because this noise signalled their enemy that the weapon was empty and the Japanese (or in some stories the Germans) were able to charge across open ground and kill the hapless GI before he could reload. Whoever first dreamed up this absurd scenario obviously didn't know the first thing about combat. The typical battlefield was a deafening place and it would be all but impossible for anyone even a few yards away to hear the ejection of the clip. Even if someone did hear, an experienced M1 user can reload his weapon very quickly. Finally, isolated duels between two enemies were, to say the least, not the norm. Even if the American with the empty M1 couldn't reload in time there were fellow GIs only too willing to do in the enemy.

Numerous changes occurred during the M1's World War Two production run. Some of these, such as the change in the rear sight, improved the weapon's performance, while others were designed to either speed up production or reduce costs. The most significant of these will be outlined in the following Collector Notes.

Even with the faults outlined above, the M1 was undoubtedly the best general issue rifle of World War Two and its performance in that conflict speaks for itself.

Typical World War II locking bar rear sight. Note the milled trigger guard and the "circle P" proof mark behind it.

Model of 1941 Johnson Rifle

The Model of 1941 Johnson rifle was the only semiautomatic service rifle other than the M1 Garand to be fielded by the United States during World War Two. Unlike the M1, which was manufactured in very large numbers and saw widespread use, the Johnson rifle was procured by the U.S. in extremely limited numbers and saw only a modicum of combat use. The Johnson rifle was the invention of Melvin M. Johnson, a native of Boston, Massachusetts, born in 1909. Johnson exhibited an interest in firearms at an early age and wrote several articles on the subject while still in his teens. Johnson graduated from Harvard Law School in 1934 and soon after entered the Marine Corps Reserve as a Lieutenant. He attended several Marine Corps Weapons Schools and served a tour at the Quantico, Virginia, base.

The Marines assigned Johnson to the Springfield Armory as an observer during the development and testing work going on at the time on the Garand rifle and its chief competitor, the Pedersen. Johnson was charged with evaluating both weapons, and his final report concluded that each rifle had inherent design flaws and neither could be efficiently mass produced.

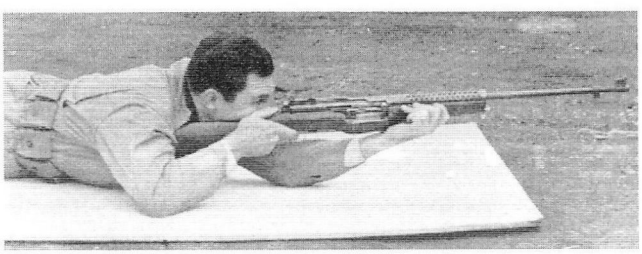
In 1935, Johnson began work on a semiautomatic rifle design of his own that he believed would be an improvement over both the Garand and Pedersen rifles. He initially conceived a retarded blowback mechanism but eventually abandoned this concept for a recoil operated action. While widely used in shotguns and low powered rifle designs, the recoil operated mechanism was something of a novelty for a full power military rifle. Johnson's original working prototype was a rather strange combination of miscellaneous parts that included an M1903 rifle barrel, a Browning shotgun hammer and a firing pin fashioned from a knitting needle!

Despite its crude components, Johnson's recoil operated rifle showed much promise and a refined prototype was built. This weapon was fired extensively at the Wakefield Marine Corps rifle range and validated Johnson's basic design premise. A light machine gun was also developed concurrently based on the same recoil operated mechanism as the semiautomatic rifle. Johnson revealed the design objectives for his semiautomatic rifle in an article he wrote for the *Marine Corps Gazette,* in which he stated that his desire was "...to place in the hands of the individual the maximum power or force which can be operated, controlled and transported by one man on his two feet."

By late 1937, Johnson was working in conjunction with the Marlin Firearms Company and had further refined his design; he was granted patent number 2,094,156. Marlin manufactured four rifles that were to be used for formal government testing. Not much is known about these early Marlin-made prototype Johnson rifles except that they were recoil operated and utilized a vertical feed magazine.

After some additional developmental refinements, Johnson gave an informal demonstration of his rifle at Ft. Benning, Georgia in June of 1938. The demonstration was successful enough to convince the Army to schedule a comprehensive Ordnance Department test of the design at the Aberdeen Proving Grounds in August of 1938.

The Aberdeen tests compared the Johnson rifle with the newly adopted Garand. The results were generally favorable toward the Johnson design, but sever-



(above) Melvin Johnson firing his semiautomatic Model of 1941 Johnson rifle. (Steel magazine)

(right) Melvin Johnson, right, discussing his semiautomatic rifle with Undersecretary of War Robert Patterson, left, in 1940.
(Book of the Garand)

M1941 Johnson rifle with attached bayonet. The Johnson was used in limited numbers by several U.S. Marine units during WWII.

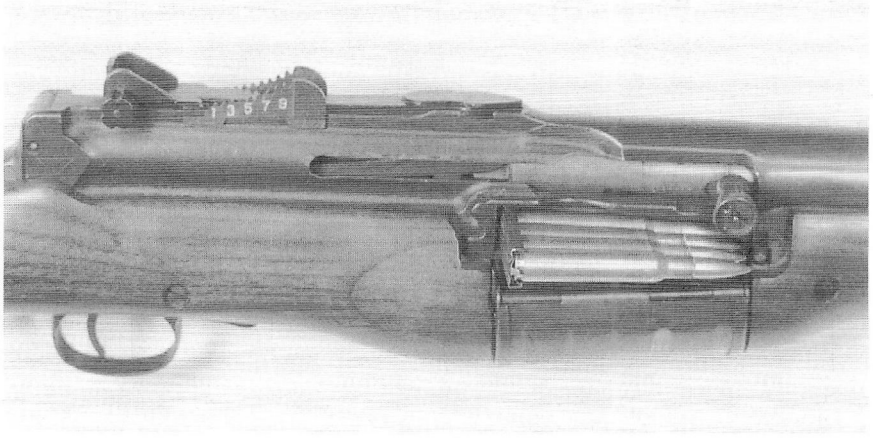
al weak areas were pointed out. Johnson immediately began work on the changes that included the substitution of a rotary magazine instead of the vertical feed type, a bolt with eight locking lugs to improve strength and accuracy and a barrel that could be easily removed. The firm of Taft-Pierce Company manufactured seven rifles which incorporated these refinements. In addition to these seven military-type rifles, a number of Johnson rifles in sporting configuration were manufactured in 1939 aimed at the commercial market. These finely finished rifles featured a detachable box magazine rather than the rotary type. The well-known commercial firm of Stoegers marketed these sporting Johnson rifles, but sales were quite low due to the unusual design and the extremely high price. Very few of the commercial Johnson rifles are around today.

The Ordnance Department tested the improved Johnson rifle in December of 1939. Some 6,000 rounds were fired through one of the test rifles with only 12 minor stoppages. The extensive testing revealed that the design had some excellent features and functioned satisfactorily. However, some shortcomings were noted that included concerns about the strength of the magazine body, the overall length of the receiver and the fact that the rifle would not function reliably with a bayonet attached. The Ordnance Department released its report on the testing of the Johnson rifle on February 23, 1940, and it concluded that the weapon was not materially superior to the M1 Garand and that no additional consideration be given to the rifle. The official test results stated that "..in spite of its alleged mechanical and manufacturing advantages, (it) did not warrant further consideration as a replacement for the M1 rifle."

Generally such a negative conclusion would have closed the door permanently on Johnson's goal of having his rifle adopted by the United States military. However, as fate would have it, at exactly the same time that the Johnson rifle was being tested and evaluated by the Ordnance Department, the new M1 was coming under a great deal of scrutiny and criticism. As we have seen, the M1 had its share of initial "teething problems" during early production of the weapon that took some time to be ironed out. These early problems were brought to light when 200 M1s were supplied to the participants at the 1939 National Matches at Camp Perry, Ohio. The experienced shooters who fired the Garand soon became aware of the problems. When the Ordnance Department representatives were questioned about them, they became uncooperative and claimed that the shooters did not know how to properly handle the rifles. Obviously, this did not go over well with the shooters, and, from a public relations standpoint, the Ordnance Department woefully mishandled the entire episode. When staff members of the National Rifle Association were refused a request to examine and test some M1s, it was felt by many that the government must be hiding something about its new rifle. Articles critical of the Garand began to appear in the *American Rifleman* and other media sources, including a number of newspapers. For example, the Washington *Evening Star* ran a series of articles on the subject in February of 1940 entitled "Battle Efficiency of Garand Rifle provokes Controversy." At the same time, the *Rifleman* published several articles that cast the Johnson rifle in a very favorable light.

By early 1940, the Garand-Johnson controversy had reached its peak. A Congressional committee threatened to halt funding for continued production of the M1 unless it could be clearly shown that the weapon was satisfactory for military use. An informal shoot-off between the Garand and Johnson rifles was held on May 5, 1940, which was attended by a number of high ranking officials, including senators and military officers. The demonstration revealed that both rifles were apparently satisfactory for military use. The chairman of the Senate Appropriations Committee, Senator Elmer Thomas, related the committee's decision when he stated that

From a layman's viewpoint, they are both mighty fine guns, and there is no particular difference. If the Garand is as good as the other, and we



(above) Side view of M1941 Johnson rifle receiver showing a five-round stripper clip partially inserted into the ten-round rotary magazine.

(above) M1941 Johnson rifle receiver markings. Since it does not have a letter prefix, this rifle was the 8,440th made.

have the machinery already set up to produce it, I see no reason to go into production on a second good gun.

Although the Senator's statement was undoubtedly true, the Johnson rifle probably had the deck stacked against it from the beginning. Since the Garand was developed and approved by the Ordnance Department, its rejection in favor of a rifle designed by an unknown junior Marine Corps officer would have spelled the premature end to a number of Ordnance officers' careers. Of course, as we have seen, subsequent events totally vindicated the adoption of the M1, but the heavy-handed tactics of the Ordnance Department in 1939-1940 caused many unnecessary problems.

After a second official government rejection of his design, Johnson still harbored some hope that the rifle could ultimately play some role in the American military arsenal. Johnson later stated that he never advocated that his rifle should be a replacement for the Garand but rather a supplement to it. Or as he put it, "...we ought to have two strings to our bow." At the same time, Johnson seemed to damn the Garand with faint praise when he said that "...it shoots pretty well." Although there are no indications that Johnson was anything but a gentleman and a patriotic American, the Garand-Johnson controversy refused to quietly go away. In December of 1940, the War Department felt it necessary to submit a "Statement of Facts" to officially deny allegations that it had been unfair in its conduct regarding the Johnson rifle. *Life* magazine called the Garand-Johnson controversy "one of the greatest military squabbles in U.S. history."

Even though arguments continued for some time, it was clear that the Johnson rifle had no chance of being adopted by the U.S. Army. Johnson and his financial backers made some contacts with several foreign governments regarding the rifle, and several expressed varying degrees of interest.

With the Army's door firmly closed on the Johnson rifle, the weapon had yet another opportunity to gain some government acceptance when the U.S. Marine Corps announced trials scheduled for late 1940 to evaluate and test semiautomatic rifle designs for possible adoption. The Marines had not adopted the Garand due partly to the early bugs and the subsequent bad publicity. As somewhat of an insider, Johnson felt he had a much better chance of his rifle gaining some acceptance by the Marine Corps than he did with the Army. The Marine Corps semiautomatic rifle trials were held in November of 1940 at the San Diego base. An evaluation board considered three rifles, the M1, the Johnson and an entry submitted by Winchester. The standard bolt action M1903 was used as the control rifle. After exhaustive testing, the board concluded that none of the semiautomatics were sufficiently superior to the '03 to warrant adoption. The Johnson rifle finished in overall second place behind the Garand but ahead of Winchester's rifle. It has been suggested that the Johnson rifle did not fare any better in the trials because the rifle tested was one of the batch of seven made by

Taft-Pierce and was almost worn out from previous testing.

The rejection of his rifle by his beloved Corps must have been a deep disappointment to Johnson. With no opportunity for domestic military sales on the horizon, Johnson redoubled his efforts to interest other nations in his rifle. Despite its rebuff by the Army and Marine Corps, the rifle possessed some excellent design features.

A rotary magazine that could be loaded with the bolt closed. This corrected the oft-mentioned problem of the Garand's inability to be readily topped off. The Johnson rifle's magazine could be loaded by single rounds or by means of the M1903's stripper clip.

The barrel was readily removable. This made it attractive for use in airborne operations and other specialized applications. This feature also allowed for barrels of other calibers to be easily substituted.

The rifle demonstrated excellent accuracy and strength due to the bolt's eight locking lugs.

The straight line stock allowed for better control when firing since the recoil thrust was in a straight line. This feature was widely used on later designs.

The rifle was designed to be manufactured on general production tooling in small to medium machine shops. This appealed to those nations lacking extensive firearm manufacturing capability.

These interesting and valuable features notwithstanding, the Johnson rifle had some weak points. During the government testing, it was mentioned that the barrel and the magazine were exposed and subject to damage. Another supposed defect, which was mentioned numerous times, was the fact that the rifle would not function properly with a standard bayonet attached. This was due to the recoil operation that required the barrel to move back and forth with each shot. The added weight of a bayonet resulted in a malfunction. It has been stated that Johnson was an expert knife thrower and did not believe that a bayonet was necessary, or even desirable, on a modern military rifle. However, it soon became apparent to him that his rifle must be capable of functioning with a bayonet for it to have any chance of being adopted as a military weapon. With this in mind, Johnson designed a very light weight all-metal bayonet. The bayonet had

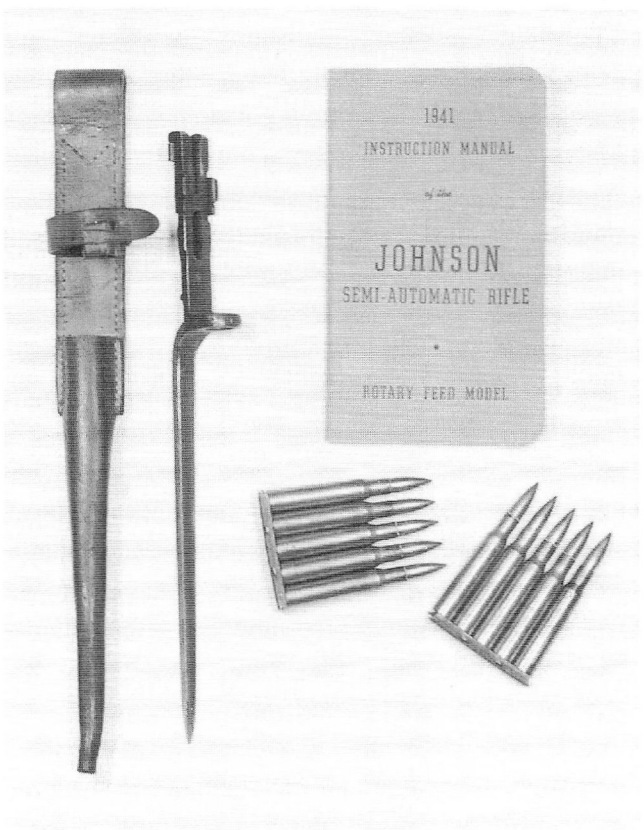
(right) M1941 Johnson rifle with barrel removed. This feature made the Johnson rifle attractive to the newly formed Marine Corps airborne units early in World War II.

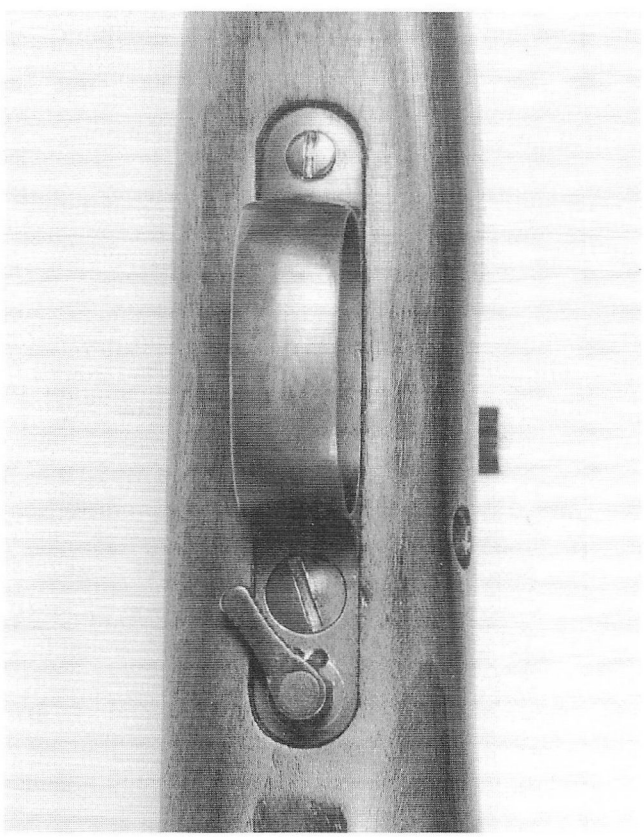
an 8" triangular blade and no real handle. The bayonet had no real utility on or off the rifle and it is obvious that it was designed simply to satisfy an arbitrary requirement rather than to have any practical value as a weapon.

By early 1941, Johnson had completed the refinements to his rifle and it was ready for marketing to suitable overseas customers. The rifle was given the designation Model of 1941, which may have been intended to convey the impression that the rifle was an officially adopted weapon. However, the United States had stopped using the year of a weapon's adoption as its model designation in the late 1920s, and, had the Johnson been adopted, it would likely have been given the designation "U.S. Rifle, Caliber .30, M2." Johnson also had finished the final touches on his light machine gun that was based on the same general recoil mechanism and shared a number of common parts with the M1941 Johnson rifle. This weapon is discussed in the section of this book covering automatic weapons.

The Model of 1941 Johnson rifle had a rather unusual appearance due to the bulging rotary magazine. The rifle's profile has been called "pot bellied" or "pregnant," and both descriptions are apt. Despite its slightly awkward appearance, the rifle actually handled quite well. The slim 22" barrel gave the rifle something of a sporting appearance, while the perforated metal cooling jacket at the base of the barrel and the bayonet lug near the muzzle made it clear that the rifle was designed with a deadlier function in mind. The Johnson rifle was stocked with good quality walnut having a typical military oil finish. The rifle featured a fully adjustable receiver mounted rear peep sight. The front sight was protected by two ears in much the same manner as the M1's front sight. The safety was conveniently positioned in front of the trigger guard and was silent in operation. Sling swivels capable of being used with standard military slings were fitted. All external metal was parkerized. The M1941 Johnson rifle weighed 8 pounds, 8 ounces (unloaded) and had an overall length of 45½".

Johnson's efforts in attempting to sell his rifle to foreign governments culminated in an order for 70,000 Model 1941 rifles by the Netherlands in late 1941. The Dutch needed these rifles to arm their troops defending the Dutch East Indies, including Java and Sumatra. The only requirement stipulated by the Dutch on the basic Model of 1941 design was that the rear sight must be graduated in meters rather than





(left) Johnson rifle accessories, including a bayonet and scabbard, original instruction manual and two five-round "stripper clips." (right) M1941 Johnson rifle safety.

yards. Somewhat surprisingly, the Dutch rifles were chambered for the standard U.S. .30-06 cartridge.

Johnson's business organization, The Johnson Automatics Trust, did not possess any manufacturing equipment or facilities, and the firm quickly began to search for a production source that could build the rifles for the Dutch contract. Johnson's task was greatly simplified because he had designed his rifle to be manufactured on general machine shop equipment. This was fortunate for the fledgling firm, since all companies with gun making equipment were already swamped with orders from the United States as well as a number of allied governments. The Johnson organization entered into negotiations with the Universal Windings Company of Providence, Rhode Island, and a contract to manufacture the rifles was soon forthcoming. Plant space in Cranston, Rhode Island, (located near Providence) was secured and production was soon underway on the Model of 1941 Johnson rifles. The facility was named Cranston Arms Company.

The Johnson rifles started coming off the assembly line in the summer of 1941 and were shipped to the Dutch as soon as sufficient quantities were on hand. Unfortunately, after only a few thousand had been delivered by early 1942, the Japanese had overrun the East Indies. By this time, about half the original contract had been shipped from the factory but had not yet been delivered to the East Indies when they were embargoed by the Dutch government in exile to prevent them from falling into the hands of the Japanese. The precise details regarding these rifles are unclear; the rifles were apparently kept in storage overseas. The remaining rifles manufactured under the Dutch contract remained in storage in Rhode Island until their fate could be determined.

By this time, the United States had entered World War Two and all branches of our armed forces were clamoring for modern military rifles. The Marine Corps had reconsidered its position on the M1 Garand and had adopted the rifle in late 1941 but there were very few available to the Corps in early 1942; the needs of the Army had first priority. When the Marine Corps declined to adopt the Johnson rifle back in 1940, it was nevertheless recognized that the weapon had some features which could be of value in certain combat applications. Due chiefly to the rifle's easily detachable barrel, the Marine Corps Equipment Board recommended adoption of the Johnson rifle for issue to some airborne units. The First, Second and Third Parachute Battalions formed in late 1942 and the First Parachute Regiment formed in early 1943 acquired enough M1941 Johnson rifles to equip the units. Although the "Para Marines" were never deployed in combat via airdrop, they and their Johnson rifles saw action in a number of campaigns in the Solomon Islands including Guadalcanal, Tulagi, Vella Lavella and Bougainville. There has been little recorded concerning the Parachute units' use of Johnson rifles, but from all indications, the weapons functioned well and performed in a satisfactory manner. Other Marine Corps units, including the Raiders, did some evaluation of the Johnson rifle during World War Two, but the weapon was not widely issued or used outside of the Parachute units. In an interesting and revealing letter, R.G. "Rudy" Rosenquist, curator and director of the U.S. Marine Raider Museum and Association and a combat veteran, gives some information regarding the Raiders' experience with the Johnson rifle. As stated by Mr. Rosenquist,

The 4th Marine Raiders did a field evaluation during training and during the New Georgia operation... with the Johnson rifle...[Some] feed problems regarding the ammo were noted and ammo was carried in five round clips. These had to be loaded by hand, singly into the side feed magazine, an accidental discharge was noted wounding a Raider in the foot. This happened with the barrel removed for cleaning - the round being held in the face of the bolt. The configuration of the exposed barrel was considered a delicate design requiring the carrier to always be careful to protect the exposed barrel. Also the weapon would not always satisfactorily cycle with the bayonet [referred to as "tent pegs" by some of the Marines] attached. It took very little, considering the above, to convince the ordnance people that the M1 Garand...which functioned well and was designed to stand up to rough field use was the better choice, also the [M1] was easier to load and had good existing web gear. I know of no combat Marine that developed any great love for...the Johnson.

The few Johnson rifles in the hands of the Marines were withdrawn from service and replaced by M1s and other weapons as they became available.

In addition to the relatively short-lived Marine Corps service, the M1941 Johnson rifle was issued to some members of the Office of Strategic Services (OSS). Since many of these operatives parachuted into enemy territory on clandestine missions, the detachable barrel of the Johnson was a valuable feature. It has also been reported that the famous First Special Service Force (the so-called Devil's Brigade), a superbly trained joint American-Canadian unit, used the Johnson rifle. The Force did use the Model of 1941 Johnson Light Machine Gun (discussed later) but

its use of the Johnson rifle is doubtful.

U.S. War Department records indicate that the United States offered to sell to the Free French forces some 10,500 M1941 Johnson rifles in April of 1943. However, no documentation has been found to verify that the French did, in fact, acquire any Johnson rifles.

Approximately 30,000 M1941 Johnson rifles are believed to have been manufactured during World War Two by the time production ceased in early 1944, but only a few thousand of these were procured by the United States government.

After his rifle met with only modest success, Johnson concentrated his efforts on refining his light machine gun design. By the time World War Two ended, few, if any, Johnson rifles were still in service. The fate of the Johnson rifles used by the Marines and OSS has not been confirmed, although Springfield Armory records indicate that as of October of 1947, the facility had "...520 serviceable and 904 unserviceable Johnson rifles, M1941...on hand." These weapons were likely destroyed soon afterward since Ordnance Department documents reveal that it was the government's policy after June of 1945 "...to destroy through mutilation all obsolete, non-standard, and unserviceable weapons in store at the various arsenals." The disposition of the rifles remaining in storage at the Rhode Island warehouse is not known but they were likely either destroyed or possibly shipped to the Dutch after the war. The Johnson rifles sent to the Dutch overseas languished in storage until about 1953, when they were purchased by the American firm of Winfield Arms. It has been reported that the tooling used to manufacture the Johnson rifle was sold to Israel in 1950 and the Israelis made a small quantity of Johnson rifles for their own use. The Chilean Navy is also supposed to have purchased approximately 1,000 Johnson rifles in 7mm after World War Two.

After sorting through the relatively large number of Johnson rifles on hand, Winfield Arms was able to replace enough missing and broken parts to begin advertising the rifles for sale. The *American Rifleman* and similar publications carried ads for the Johnson rifles that were offered in several grades ranging from about $70 for standard grade unaltered rifles to sporterized versions with added features, such as blued metal parts, new barrels and recoil pads. The latter grades sold for as much as $110. Ads for these surplus Johnson rifles ran until the mid-1960s when the supply was finally exhausted.

Collector Notes

U.S. RIFLE, CALIBER .30, MODEL OF 1903

There are basically two general categories of M1903 rifles as used during World War Two; those made prior to the war and the rifles manufactured from 1941 to 1944.

Pre-Second World War Manufactured M1903 Rifles

All pre-WWII M1903 rifles were manufactured by either Springfield Armory or Rock Island Arsenal. While some pre-WWII '03s were issued and used without any alteration, the majority were refurbished for use during World War Two. Although the extent of the rebuilding varied from rifle to rifle, the following alterations are typical.

(1) The metal was refinished with the commonly seen WWII-style of greenish-gray parkerizing. The pre-WWII '03 rifles were blued prior to 1918. From after 1918 until just prior to World War Two, the M1903 rifles were finished in a distinctive black tinted parkerizing.

(2) The stock and hand guard were refinished or replaced. The pre-WWII Type S stock (without pistol grip) had finger grooves on the forend. WWII-replacement stocks were more crudely made and lacked the finger grooves. If the original stock was retained, the wood was sanded and refinished, often obscuring the original Springfield or Rock Island inspector cartouches. These stocks can be further identified, as the initials of the arsenal performing the overhaul were stamped on the left side.

(3) The barrel was replaced if appreciable wear or erosion was present. Large numbers of replacement '03 barrels were made during World War Two by the Springfield Armory and the commercial firms of High Standard and Sedgeley. Since Springfield did not make any '03 service rifles after the late 1930s, a Springfield receiver with an SA barrel bearing World War Two dates is clearly a rebuild. Even when the rifle's original barrel was retained, the type of parkerizing will usually reveal if the weapon has been rebuilt.

(4) A gas escape hole was added to many of the earlier receivers. This further identifies WWII-rebuilt rifles since this feature was not found on original, unmodified '03 rifles manufactured prior to 1936. Not all WWII-rebuilt M1903 receivers were so modified.

(5) Miscellaneous parts such as rear sight knobs and other items were replaced by parts of later vintage. In addition, many component parts needing replacement that were originally of

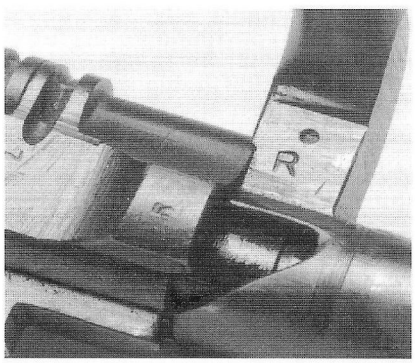
(left) Arsenal stock rebuild marking. This M1903 rifle was rebuilt at the Ogden (Utah) arsenal.

milled construction were replaced by later parts stamped out of sheet metal. These include barrel bands, trigger housing assemblies, swivels and buttplates.

Remington M1903 and M1903 (Modified) Rifles

The M1903 rifles of new production during World War Two were made by Remington. These were essentially identical to the post-1918 rifles made by the Springfield Armory. Identification is relatively simple and straightforward. The receiver ring was marked "Remington" rather than Springfield Armory or Rock Island Arsenal. The barrel was likewise marked "RA" and stamped with the month and year that it was produced. The very early Remington M1903 rifles had the black tinted parkerizing as found on the pre-WWII '03 and the finely crafted Type S finger groove stock. The Remington-made stocks of this type can be identified as the left side is stamped "RA" (Remington Arms) and the inspector cartouche is "RLB" (Roy L. Bowlin).

Springfield or Rock Island stocks do not have this inspection marking format. The component parts of these early Remington '03s were of milled construction like their pre-war armory counterparts. A useful feature for today's collector is the fact that virtually every component part of the Remington M1903 rifles was marked with a small "R" to denote the manufacturer. If a particular Remington



'03 rifle has some parts lacking this marking, then some of the parts have been replaced. This could have occurred in subsequent arsenal rebuild or after the weapon left U.S. service.

The early Remington M1903 rifles were manufactured from about November of 1941 until sometime in April of 1942 when the M1903 (Modified) rifle was phased into production. These early rifles will be found in the serial number range from 3,000,000 to approximately 3,050,000.

The Remington M1903 (Modified) rifle as produced slightly later had the same type of receiver and barrel markings. The black tinted parkerizing was replaced by the later greenish-gray variety, and the stocks lacked finger grooves and were not as well made. A number of machining shortcuts and some stamped parts were also evident. Among the most noticeable of the manufacturing shortcuts was the rear sight base which was not milled flat on either side as found on earlier M1903 rifles.

The "RA" and "RLB" stock markings are present where some differences in the configuration existed. These rifles also had the "R" marked parts. The M1903 (Modified) rifles were numbered in the same sequence as the earlier Remington rifles until the introduction of the M1903A3 after serial number 3,365,000 (approximately).

M1903A3 Rifle (Remington and Smith-Corona)

The M1903A3 rifle is also very easy to recognize. The receiver ring was marked with "03-A3" and the name of the manufacturer (Remington or Smith-Corona). It is interesting to note that the "03-A3" was a colloquial designation that is not normally found on U.S. military weapons. Like the earlier Remington rifles, the '03A3's barrel was marked with the initials of the maker ("RA" or "SC") and the month and year of production. Most of the barrels were of the two-groove variety. The most obvious difference between the M1903 and the M1903A3 rifles was the rear sight. Rather than being mounted on the rear of the barrel as found on the '03s, the 'A3 had a peep sight mounted on the rear of the receiver bridge. The '03A3's stock was even less well made than that of the M1903 (Modified). The stock most commonly used had no finger grooves or pistol grip, although some were fitted with the semi-pistol scant stock and a few used the full pistol grip Type C stock. All varieties of the M1903A3 stocks had the same general type of marking format as the earlier Remington '03 stocks, except that the inspector "FJA" (Frank J. Atwood) was substituted for "RLB". Both Remington and Smith-Corona M1903A3 rifles had this type of car-

touche, but Remington stocks can be identified by the added "RA" marking not present on Smith-Corona rifles. As stated, the M1903A3 rifles were noticeably less well made than earlier versions but they were strong and serviceable rifles. The '03A3 is the most available variant of a WWII-production '03. A number were rebuilt during and immediately after World War Two, and these can sometimes be found today still in the cosmoline coating applied when the rifles were packed for storage.

Many of these rebuilt rifles are mistaken for factory original rifles but are simply weapons that have never been used since their rebuilding. This is not to imply that such rifles are not good collectibles, as they most certainly are, but the vast majority are not factory new guns as many people might assume.

Remington M1903A4 Sniper's Rifle

Like its service rifle counterpart, the M1903A4 sniper rifle is easy to identify. All examples were made by Remington and are generally identical to the Remington M1903A3 rifle with the following exceptions.

(1) The "03-A3" marking was retained but was moved to the extreme left side of the receiver so it could be read with the scope mount in place.

(2) The rear sight was removed and a Redfield "Junior" scope mount was installed. The Weaver 330C, M73B1 or M8 telescopes were issued with the M1903A4 rifle during World War Two.

(3) The front sight was not mounted although the milling cuts for it were present.

(4) The full pistol grip Type C stock or the semi-pistol grip stocks were used. These had the same type of markings as found on the M1903A3 stocks.

(5) The bolt handle was concavely forged to clear the body of the telescope.

Some of the early M1903A4 rifles were issued with commercial production Weaver 330C telescopes with cross hair reticles. As the available supply ran out, additional scopes were manufactured and procured under government contract. These were essentially identical to the

330C but were marked with the military designation "M73B1". A very scarce later variant of this scope was adopted as the M8, which differed mainly in having a tapered post reticle rather than the cross hairs of the 330C and M73B1 scopes. Leather lens covers were issued with the Weaver scopes during World War Two. A plastic version was introduced after the war but these would not properly be found on an "as issued" WWII scope.

The M1903A4 serial numbers were in the following blocks of numbers:

3,407,088 - 3,427,087
Z4,000,000 - Z4,002,920
4,992,001 - 4,999,045

The Z-prefix 'A4 rifles are a scarce and desirable variant with total production of fewer than 3,000.

The M1903A4 was the only '03 sniper rifle that was originally manufactured as a sniping weapon. Unlike the other '03 sniper rifles, it is virtually impossible to fake an M1903A4 sniper's rifle due to the peculiar placement of the receiver ring markings. 'A4s have become very popular with collectors today and prices have risen dramatically within the past few years. After World War Two, the Weaver telescope was replaced by the post-war M84, but most collectors prefer to have their rifles with the correct scope. Good condition military issue M73B1 scopes have gotten to be rather tough to find given the increased demand for restoration purposes.

Other WWII M1903 Sniper Rifles

Unlike the M1903A4 detailed above, identifying the following two '03 sniper rifles can be a difficult job for even an experienced collector. These two weapons were converted from issue '03s which, obviously, makes it much easier to modify such rifles into sniper configuration today. The lack of government documentation such as serial numbers and other data for these weapons also makes positive identification quite tricky.

M1903 Rifle with Winchester A5 or Lyman 5A Telescope

There are no known serial number ranges for these rifles. Many of the early '03s converted by the Marine Corps for use with the Winchester A5 scopes seem to fall roughly in the 468,000 to 474,000 serial number range, but rifles known to be original have been seen with serial numbers well into the 600,000 range.

Most of these rifles were not sent through arsenal rebuild and still retained the original pre-1918 Springfield Armory blued finish rather than the later parkerizing. The only change to the standard '03 rifle was the hand guard. This had to be modified by having a portion milled down and a hole inletted so the front scope mount base would fit. The Winchester A5 scope was the scope most often used with these rifles although many were replaced by the updated Lyman 5A during the early days of World War Two. These scopes were generally issued with leather carrying cases.

USMC M1903A1/Unertl Sniper Rifle

Like the '03/A5 variant, identifying an original USMC M1903A1/Unertl sniper rifle can be a difficult task. Surplus Unertl USMC telescopes and mounts have been available for a number of years and a competent machinist can modify a M1903A1 rifle today just as easily as could a Marine Corps armorer 50 years ago. The workmanship of the modified hand guard should be examined very closely to be certain that the work is up to arsenal standards, but this is no guarantee of originality. The following are the general characteristics of the USMC M1903A1/Unertl sniper rifles.

The serial number range was approximately 1,200,000 to 1,500,000. Barrel dates on original specimens can range from the early to late 1930s. All will be of Springfield Armory manufacture. The rifles converted from National Match rifles should have the star gauge mark on the muzzle crown.

These rifles were issued with standard pre-WWII Type S full pistol grip stocks. Most of these stocks used on the USMC sniper rifles did not have inspector cartouches and many were heavily varnished for waterproofing. Most of the stocks will be marked with the Drawing Number on the bottom of the butt area.

The proper Unertl telescopes were marked "USMC-SNIPER" on the top of the tube. The target-type mounts were also made by Unertl and so marked. The Marine Corps did not mount the recoil springs on their sniper telescopes as found on the civilian Unertl target telescopes as it was felt that sand could become caught between the spring and scope body and mar the tube. Therefore, the scope had to be manually pulled back into place after each shot. A micarta carrying can was issued with the Unertl scope but was seldom employed in the field due to its weight and bulkiness.

The USMC M1903A1/Unertl sniper rifle is a visually impressive weapon and is quite popular with today's collectors.

There were numerous accessories and appendages used with the '03 rifle during its long tenure of service. Two of the most important such items are the sling and bayonet. Most of the M1903 rifles issued during World War Two (and previously) were fitted with the leather M1907 sling although the web M1917 and M1923 were authorized as well. During World War Two, the much simplified web M1 sling was introduced.

The M1905 bayonet with its 16" blade was standard issue for the '03 rifle from 1905 until well into World War Two when the 10" blade M1 bayonet was adopted. Many of the earlier M1905 bayonets had their blades shortened to 10" length. The bayonets and their scabbards are covered in the Edged Weapons section of this book.

Any of the WWII M1903 rifles are very interesting additions to Second World War collections. Except for the sniper rifles, they are among the most readily available and reasonably priced weapons of the genre. Although typically not as attractive or highly valued as the pre-war '03s, the WWII variants are interesting and desirable rifles in their own right.

There were probably more variants of the '03 rifle (in addition to the myriad accouterments and accessories) than any other U.S. military weapon. It is well beyond the scope of this book to give specific details on each and every aspect of interest to collectors of the '03. My book *A Collector's Guide to the '03 Springfield* details the many differences between the earlier pre-WWII '03s and those made during the war. The major accessories are also covered.

The average person may think of an '03 as only being in the hands of a World War One Doughboy "Over There" in France. As we have seen, later variants of the rifle were also in the hands of the hard-bitten Marines who, with grit and determination, battled the Japanese for control of the strategic islands during the dark days of World War Two. '03 rifles saw much use in the early U.S. Army campaigns as well. The M1903's Second World War exploits and its contributions to our war effort during this period should not be overlooked by historians or collectors.

M1917 "ENFIELD"

Unlike many of the weapons discussed, collector identification and evaluation of WWII-issued M1917 rifles is relatively simple and straightforward. As mentioned, all M1917 rifles were originally of 1917-1919 vintage. Virtually all of these weapons were placed in storage in the early 1920s and were not reissued until the opening stages of the Second World War.

As stated, many of the M1917 rifles reissued for use during World War II underwent arsenal overhaul or rebuilding. The degree of refurbishing varied from rifle to rifle but the following are the characteristics typical to these M1917 rifles.

(1) *Parkerized finish.* The majority of the M1917 Enfield rifles were originally factory blued. When overhauled during World War Two, the weapons were generally refinished in the standard gray or greenish-gray parkerizing. M1917 rifles retaining their original WWI-vintage factory bluing are not very common today and are worth somewhat more than a typical WWII rebuild.

(2) *Rebarreled.* As mentioned, the government contracted with Johnson Automatics and High Standard for the production of replacement M1917 barrels during World War Two. Most of these barrels were not dated and were marked with the initials of the maker ("JA" or "HS") and stamped with the ordnance flaming bomb insignia. It should be noted that the original 1917-1919 vintage barrels were not replaced if they were in acceptable condition at the time of the arsenal inspection and rebuild procedure.

(3) *Refinished Stock.* The arsenal rebuilding generally called for the original stock to be sanded and refinished. This usually resulted in the factory inspector's markings (typically the WWI-era eagle head) being obliterated. The initials of the arsenal performing the rebuilding were stamped on the left side of the stock.

Any worn or unserviceable parts were also replaced during overhaul. This would invariably result in mismatched components since the parts of factory original M1917 rifles were marked with the first letter of the maker ("W", "R" or "E"). While all matching parts are desirable in an "as issued" WWI Enfield, mismatched parts are to be expected in a WWII rebuild.

The M1917 rifle was issued with the M1917 bayonet which, like the rifle, was adopted from a British design. No M1917 bayonets were made after 1919 (except for a small batch during the Vietnam War) and sufficient numbers were on hand to meet the demand during World War Two. The M1917 bayonet was also used with some military issue shotguns during both wars. The M1917 bayonet and its scabbard were previously examined in the Edged Weapons section of this book.

The Enfield utilized the same type of slings that were used with the M1903 rifle. The leather M1907 sling was the most commonly used, but the web M1917 sling, M1923 sling and the later M1 sling were all approved for use with the M1917 rifle.

There was a Basic Field Manual (FM 23-6) dated August 3, 1942, printed for the M1917 rifle. This manual is not as commonly encountered as the WWI-vintage manuals today and makes a nice addition to a WWII-issued Enfield.

The World War Two overhaul programs, as well as subsequent civilian sporterizing of a great many Enfields, have resulted in unaltered, original M1917 rifles becoming harder to find and more expensive with each passing year. Collector interest remains fairly high for original WWI rifles while the later WWII rebuilds have not been particularly popular with many collectors. However, as interest in and demand for examples of World War Two weapons continues to escalate, decent examples of Second World War arsenal rebuilt M1917 Enfields are certain to become more desirable.

While not generally thought of as a World War Two weapon, the M1917 Enfield served in a yeoman-like manner during this period. The rifle is often neglected by many collectors and is frequently missing from World War Two collections. Fortunately, this oversight remains fairly easy to rectify, and a collector wishing to acquire an example shouldn't have too much difficulty in doing so. While the M1917 Enfield did not play a significant role in combat during World War Two, it nevertheless made a valuable contribution to the American war effort.

M1 GARAND RIFLE

Collector interest in the M1 rifle has increased tremendously within the past five or six years and it is now among the most popular collecting themes.

Even though some four million M1s were made during World War Two, original unmodified examples are surprisingly uncommon today due to the large scale post-war arsenal rebuilding programs. In addition, large numbers of M1 rifles were supplied to some of our allies, particularly South Korea, and thousands have been brought back into the United States during the past several years. These rifles, many of which are still around today, are typically in poor condition and exhibit refinished metal and rough, refinished or replaced wood. The name of the importing firm is generally stamped on the left side of the barrel. While generally unsatisfactory for collecting purposes, some can be adequate shooters. A two-tier market has developed with the re-imports at the low end of the price scale and the collector-grade M1s at the top. Given comparable condition, most collectors tend to agree on the most desirable types of M1 rifles.

(1) Original unmodified rifles.
(2) Properly restored rifles.
(3) Government rebuilt rifles.
(4) Typical imports.

There have also been many commercially made M1 rifles on the market in the past few years. These were made with commercially produced receivers and, often, other parts, including barrels and stocks. A commercial firm has patented the name "Springfield Armory", which is often stamped on the receivers of such weapons. These can be easily identified as they have serial numbers over 6,000,000, which are much higher than the serial numbers of the GI M1s, which have not been manufactured since 1957. These commercial M1s are usually fine shooters but have no value as martial collectibles.

Since it is beyond the scope of this book to cover each and every feature of the rifle in detail, this section covers some of the main features that should be examined when attempting to identify an original World War Two production M1 rifle.

The following features should be carefully observed, as their absence on a particular rifle is evidence that the weapon is not as issued. Of course, even if the proper parts are present, it is possible that the rifle has been restored. Such restored rifles, if the work is properly done, are fine collectibles but are not as valuable or desirable as totally original rifles.

(1) The only World War Two manufacturers of the M1 rifle were the Springfield Armory and the Winchester Repeating Firearms Company. The name of the maker will be found on the receiver. These M1 rifles were typically finished in a greenish-gray shade of parkerizing. Other shades of parkerizing or shallow and indistinct receiver markings are indications that the rifle has been refinished. The receiver should also be closely checked to make sure that it is not one of the many torch-cut by the government during the 1960s and then salvaged by welding and refinishing. Close scrutiny will usually reveal such receivers.

(2) The barrel should be produced by the same manufacturer as the receiver and both should be of the same vintage. Springfield Armory barrels made after mid-1940 were stamped on the right side with the initials "SA" and the month and year that the barrel was made. Table #22 in the back of the book lists M1 serial

numbers by monthly production. A barrel date should correspond with the vintage of the receiver. If any variance is noted, it should be no greater than two or three months. World War Two Winchester barrels were not dated. The initials "WRA" were marked on top and cannot be seen without removing the rear hand guard. The typical Winchester trade mark/proof mark and intertwined "WP" will be found on the right side of the barrel in approximately the same position as the markings on the Springfield M1 barrels.

(3) The World War Two Springfield and Winchester M1 stocks were stamped on the left side with the initials of the manufacturer ("SA" or "WRA") and those of either the commanding officer of Springfield or the head of Winchester's Ordnance District. Table #23 will give

the correct types of stock cartouches for WWII-vintage M1s. Original WWII M1 stocks with cartouches are much in demand for restoration purposes today and some stamped with fake cartouches are showing up. Some of these stocks are original GI stocks that have had the original cartouche worn off from either wear or refinishing, and others are newly made reproduction stocks. An M1 stock that appears absolutely brand new even with what appears to be a WWII-vintage cartouche should be examined very closely. Likewise, a stock showing some wear and age with a crisp cartouche that appears as if it could have been stamped on the stock yesterday probably was! World War Two Garands with their original cartouched stocks are avidly sought by collectors today.

(4) The operating rod should be checked to determine if it has a relief cut at the juncture of the tube and handle. This feature was added to operating rods during post-war rebuilding to eliminate stress cracks that could appear in this area. Post-WWII production operating rods were manufactured with this improvement. The presence of an operating rod with a relief cut is an indication that the item has been either altered from its original World War Two configuration or is a post-war part and should be cause to examine the entire weapon very closely to determine if other parts are incorrect.

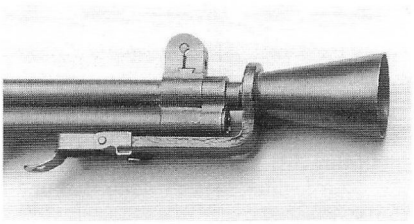
(5) At the time of the first assembly line production of the M1 in 1937, virtually every part of the rifle was marked with a Drawing Number. When Winchester began Garand production, the initials of the maker ("SA" or "WRA") were stamped next to the drawing number to identify the maker. When a part was revised, a revision number was stamped next to the part's drawing number. For example, the M1 bolt's drawing number is D28287. The first manufacturing revision of the bolt was indicated by changing the number to D28287- 1. Of course, the initials of the maker ("SA" or "WRA") would be stamped next to the drawing number. As production demands increased, fewer and fewer parts were stamped with drawing numbers. By the middle of World War Two, the practice of stamping drawing numbers was limited mainly to the major components including the barrel, receiver, operating rod, trigger housing and hammer. A person desiring to obtain an original matching WWII M1 should be certain that all parts are marked with correct drawing number and revision numbers. All parts should also be made by the same manufacturer. For example, there shouldn't be any "SA" marked parts on a Winchester Garand or vice-versa. Of course, mixed parts are the norm for arsenal rebuilt rifles.

(6) There are three basic types of rear sights used on M1 rifles. These have been termed Type 1, Type 2 and Type 3 rear sights by collectors, although such designations were never official. Type 1 rear sights were used from the time of the rifle's adoption until sometime in late 1941 or early 1942 (a bit later for Winchesters). The Type 1 rear sight is characterized by having a spanner nut (a.k.a. flush nut) on the right knob. This sight did not hold its adjustments very well and the Type 2 was adopted to eliminate this problem. Type 2 rear sights have a locking bar on the right knob which can be tightened down after adjustment to hold it in place. The majority of WWII M1s were issued with this type of rear sight. The improved Type 3, adopted as the T105, was standardized very late in World War Two. This was an improved rear sight that could hold adjustments without the need for a locking bar. Although it was introduced too late to see any use during World War Two, the T105 was the standard post-war M1 sight.

The above-enumerated items are, by no means, the only features which should be examined when evaluating a supposedly original WWII M1 rifle. Such features as gas cylinders, triggers, trigger guards, rear hand guard clips, follower rods, lower bands, front sight seals, trigger housings and virtually every other component of the M1 rifle was changed to some degree during the war. These changes are of interest to collectors when determining if a particular rifle remains in its original World War Two configuration. As stated, detailing each and every change during the M1's World War Two production run is well beyond the scope of this book. For someone wishing to explore this further, my book *A Collector's Guide to the M1 Garand and M1 Carbine* gives more detailed information aimed at collectors or potential collectors of these weapons.

M1C

Identifying an original M1C can be a very tricky proposition. There are many more fakes around today than original rifles. Anyone contemplating the purchase of such a rifle and the typical outlay of several thousand dollars should proceed with the utmost caution and, if possible, consult someone knowledgeable in the field. An original WWII M1C will be of Springfield Armory manufacture in the 3,000,000 to 3,800,000 serial number range and will evidence all the other features of a circa late 1944 to mid-1945 M1. The Griffin & Howe base should be numbered to the receiver (except possibly for very late rifles) and the G&H mount should also be serially numbered. The scopes and mounts were often mixed in service, so non-matching numbers should not disqualify an otherwise correct piece. The rifle should have either an M81 or M82 scope, an undated T4 leather cheek pad (generally made by the firm of K-Line) and an M2 flash hider manufactured either by Springfield Armory (marked "SA") or by the Hart Manufacturing Company.



As with the M1903 rifle, there were many accessories and appendages used with the M1 rifle. The Garand was designed to utilize most of the same accessories as the '03, including slings and bayonets. We have already discussed the various bayonets used with the M1 rifle and the M7 grenade launcher will be discussed in a later section of this book. One interesting accessory that was used in fair numbers during World War Two was the leather scabbard. While designed to be used by the old horse cavalry, the M1 leather scabbard was utilized to carry the Garand on motorcycles, jeeps and other vehicles. Detailing all of the myriad items associated with the M1 is well beyond the scope of this book. Anyone wishing to explore the subject further would be well advised to obtain a copy Billy Pyle's book *Ordnance Tools, Accessories & Appendages of the M1 Rifle.*

An early WWII photo of the author's father, Charles K. Canfield, Sr., holding an M1 rifle in a leather scabbard.
(Charles K. Canfield, Sr.)

Even though the recent rapid rise in collector interest in the M1 has caused an amazing price appreciation and shortage of collector grade specimens, the M1 remains an extremely collectible rifle.

If a person had to choose only one weapon to be representative of America's involvement in the Second World War, the M1 rifle would be a logical choice. The M1 is arguably the best service rifle ever fielded in quantity by any nation before or since. General G.M. Barnes stated that "The M1 rifle had no equal in the war." This is a sweeping statement, but the weapon's superb performance in World War Two and subsequently certainly gives the assertion a great deal of credibility. No less of an expert on military matters, General George S. Patton summed up his feelings about the Garand when he stated that "The M1 rifle is the greatest battle implement ever devised." Higher praise would be difficult, and if any military rifle is entitled to such accolades, it is certainly the M1 Garand.

MODEL OF 1941 JOHNSON RIFLE

Identifying an original M1941 Johnson rifle is a relatively easy matter. The overwhelming majority of rifles seen on the market today are the former Dutch rifles. However, there were no special markings known to have been applied to the Marine Corps and OSS guns, so it is not possible to state definitively that a specific Johnson rifle was not one issued to one of the American units that somehow "made it back alive."

The top of the receiver of the M1941 Johnson rifle was marked:

Cal. 30-06 Semi-Auto
Johnson Automatics
Model of 1941
Made in Providence, R.I., U.S.A.
Serial #

The right side of the receiver was marked "Cranston Arms Co." enclosed in a triangle.

It is interesting to note that the terms "Cal. .30-06" and "Model of 1941" are commercial designations and are not U.S. military nomenclature.

Johnson rifles were not marked with the date of production but determining the approximate period of production is not difficult. The Johnson rifles were serially numbered in blocks up to 10,000. The first block of serial numbers ran from 1 to 10,000. The second block had an A prefix, the third block a B prefix, and so forth. For example, the Johnson rifle with the serial number A3345 was the 13,345th rifle produced. There are no known records to indicate the serial numbers of the Johnson rifles procured by the Marine Corps, although such records would be invaluable to today's collectors.

Most collectors are interested in obtaining a M1941 Johnson rifle in original military configuration. There are several things to look for when evaluating such a rifle:

(1) All exterior metal surfaces are parkerized except for the bright finished bolt.

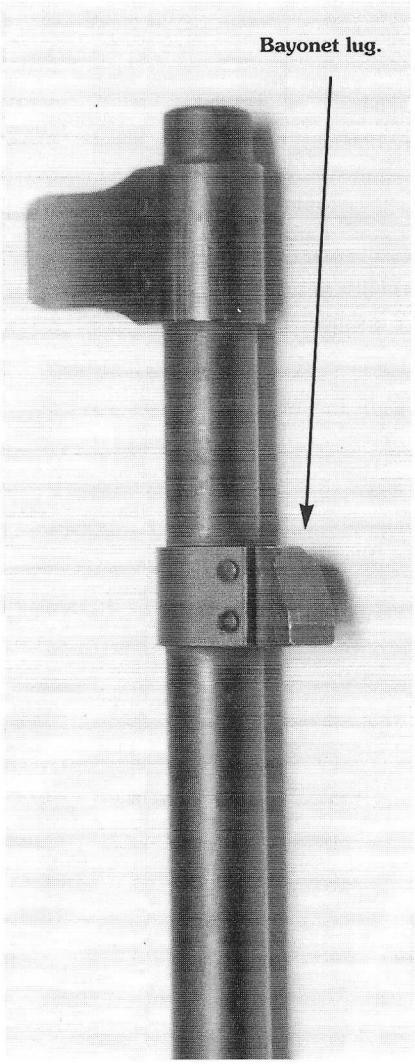
(2) The front of the barrel collar was marked "30-06" in the 12 o'clock position and "41" in the six o'clock position. There were some Johnson rifle barrels made in .270 and 7mm caliber, but these were not used in United States military service.

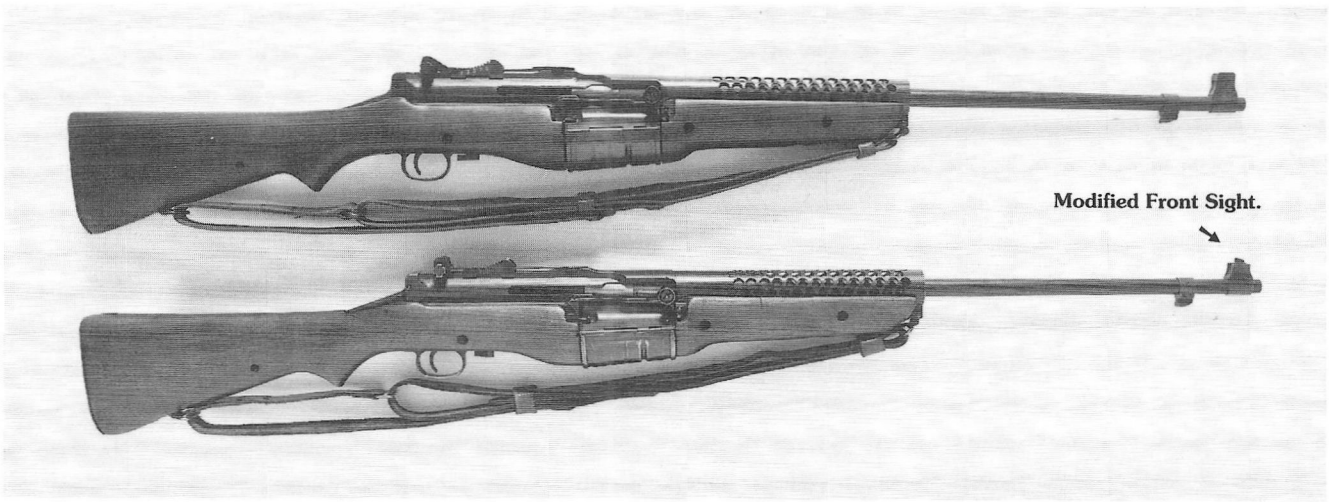
(3) The buttplate was checkered metal with no recoil pad.

(4) The adjustable rear sight was graduated for meters rather than yards.

(5) The stock was plain and unadorned with no checkering or other embellishments.

(6) The barrel should have a bayonet lug. A number of Johnson rifles are missing their bayonet lugs which devalues the piece for collecting purposes.





The most highly sought-after Johnson rifles are those issued to the Marine Corps parachute units in late 1942 and early 1943. Unfortunately, it is difficult, if not impossible, to positively identify such weapons without accompanying convincing documentation pointing to a USMC connection. There are only a handful of M1941 Johnson rifles with strong Marine Corps provenance known, but all such weapons share a few common traits. One little-known feature of the USMC Johnson rifles was the fact that most, if not all, had the protective "ears" on either side of the front sight blade removed. The known original specimens have serial numbers that range from the high first block with no letter prefix (8000+) and the low second block with an "A" prefix (under serial number A1800). There were no special markings added to the wood or metal. It has been reported that Melvin Johnson acquired about 100 Johnson rifles from the Marine Corps after the war for commercial resale that may have had a small "US" hand-stamped on the receiver. Johnson rifles with "USMC" markings on the wood or metal and/or "circle P" stamps on the stock are highly suspect. The possibility always exists that a con artist could remove the ears on standard Dutch Johnson rifles, so this feature does not necessarily indicate a genuine Marine Corps Johnson rifle unless there is other documentation.

The Johnson rifle bayonet can still be found today, but examples are not extremely common. Some will be noted stamped with serial numbers while others are unmarked. The significance of the marked vs. unmarked Johnson rifle bayonets is not known. The cylindrical leather sheath is somewhat less common than the bayonet, and a collector should proceed with caution as newly made fake Johnson rifle bayonet sheaths have been spotted recently. The originals (as well as the fakes) are unmarked and made of a light russet leather. It should be remembered that the general overall condition of the sheath should match that of the bayonet.

The Johnson rifle could be used with any of the U.S. service rifle slings, but the leather M1907 was the undoubtedly the most commonly used.

Most Johnson rifles found on the market today are not in pristine condition which is indicative of the poor storage conditions overseas during and after World War Two. An original example in excellent to mint condition is a collector's prize. It should be mentioned that at least one commercial firm today is acquiring used Johnson rifles and refinishing them to "as new military specs." The sporterized Johnson rifles sold during the late 1950s and early 1960s are fine shooters and are interesting in their own right. However, they are not desirable for martial collecting and will invariably be priced substantially lower than comparable "as issued" military specimens.

Even though the Johnson rifle is now but a footnote to the history of World War Two U.S. military weapons, it is still a most interesting and valuable item. Its unusual design, its tenure of service (limited as it was) in the hands of the Marines in the Pacific and its clandestine role as an OSS weapon all combine to make the rifle eminently collectible. The Johnson rifle is still a rather unknown quantity to many people but the weapon's popularity is growing and prices are now passing premium collector grade Garands. As more and more people become aware of the uniqueness and desirability of the Johnson rifle, its status in the marketplace will surely continue to grow. Many Second World War military arms collections do not include a Johnson rifle but, even given the weapon's limited use, it is a "must" to complete the picture of the U.S. military firearms of the war. If the United States had not adopted the M1 in the late 1930s and had not had it in full scale production prior to Pearl Harbor, it is entirely possible that the Johnson rifle would have played a much larger role in the war. Its main handicap was that it was always in the very large shadow of the magnificent M1 Garand rifle.

The .30 Cal. Carbine

Only one United States military weapon rivaled the M1 Garand in numbers produced and widespread use during World War II. That weapon was the M1 carbine. The carbine was originally conceived and adopted as a new class of weaponry and eventually was manufactured in greater numbers than any other American military firearm, including the Garand rifle.

The genesis of the carbine began after the First World War when the concept of a light rifle was explored. The war had shown that the full weight and power of a typical service rifle was not always necessary in certain combat applications. However, little experimental work on such a concept was forthcoming after the Armistice since the period of the 1920s and most of the 1930s was a time of relative world peace.

The carbine was developed as a response to the Blitzkreig warfare tactics so successfully employed by the Germans in 1939-1940. The use of rapidly moving mechanized columns and vertical envelopment by airborne troops soon made it apparent that the old concepts of fixed fortifications and static front lines were outmoded. Under these new doctrines of war, rear echelon troops that were previously considered as essentially non-combatant could, at least in theory, become engaged by hostile forces with little prior notice. Clearly, weapons other than the traditional side arms (pistols) were needed to arm such personnel. On the other hand, it was not practical to burden many of these soldiers with service rifles, submachine guns or automatic rifles since such heavy and bulky weapons could be a hindrance to the performance of their assigned duties.

The requirements for a light rifle were dusted off and re-evaluated. In addition to arming the rear echelon troops previously mentioned, a satisfactory light rifle type weapon could also be of value to such personnel as line officers, Signal Corps troops and crew-served weapons teams, which had been armed almost exclusively with pistols. It was felt by many within the War Department that a satisfactory light rifle could not only take the place of the pistol, but it could also serve as a replacement for the submachine gun.

In June of 1940, the U.S. Army took the first step toward fielding a light rifle by issuing a requirement for such a weapon. My book *Winchester in the Service* gives a detailed background of the development and eventual adoption of the M1 carbine. The Army issued very general specifications for the new weapon to civilian and Ordnance Department designers so that new and innovative ideas could be forthcoming. The basic requirements were that the proposed weapon must be

WWII M1 carbine. The carbine was produced in greater numbers than any U.S. military small arm. Originally intended to replace the pistol and submachine gun in service, it did neither. However, it saw very extensive service use and was often used as a substitute for the rifle with varying degrees of success.

compact, capable of semiautomatic or fully automatic fire, weigh no more than five pounds and have an effective range of 300 yards. The Army soon settled on a standard cartridge for the new weapon, which was a .30 caliber rimless round based on Winchester's .32 Self Loading Cartridge. The requirements mandated that all guns submitted for testing must be chambered for the new light rifle cartridge. A series of tests were scheduled to begin on May 1, 1941. Nine entries were submitted for testing and evaluation. None of the designs proved to be acceptable and a second test was scheduled for September 15, 1941. Winchester did not submit a gun for the first series of tests because the firm was heavily involved in production of the M1 Garand but agreed to do so for the second test after some unofficial encouragement by the Ordnance Department.

Winchester had been experimenting for some time with a short stroke gas piston mechanism and built a trial light rifle using this design. Winchester completed a hand-made rifle to demonstrate the basic design premise to the Ordnance Department. The ordnance people were suitably impressed and urged Winchester to submit a prototype for the upcoming tests. Working literally around the clock, Winchester completed the working prototype just in time for the new round of tests. The new tests evaluated some refined entries from the first trials, as well as a few new designs, including Winchester's gun. The grueling testing eventually narrowed the field down to Winchester's gun and a design of John Garand's submitted by the Springfield Armory. The testing was concluded on September 26, 1941, and four days later it was announced that the Winchester design was the winner. A few minor changes were requested by the Ordnance Department and the famous M1 Carbine was born.

The Ordnance Department chose to adopt the new weapon as the "Carbine, Caliber .30 M1" rather than use the light rifle nomenclature that many felt could be confused with the M1 rifle. The term "carbine" was a resurrection of a designation not used by the military since prior to the adoption of the M1903 Springfield. Previously, beginning in 1870, a carbine was essentially identical to the contemporary service rifle of the period, with the exception of having a shorter barrel and stock. The new M1 carbine, on the other hand, was an entirely different weapon than the M1 rifle. Although its breech action closely resembled the Garand and the weapon was sometimes referred to as the "Baby Garand" at the time of its adoption, the two weapons fired totally different cartridges and had little in common other than .30 caliber bores. The M1 rifle's .30-06 cartridge was much more powerful than the .30 carbine round. The carbine was tested with detachable box magazines of varying capacities, but a 15-round magazine was adopted as standard.

Winchester quickly began preliminary engineering work on the new weapon. The company built several pre-production prototype carbines and soon completed the necessary manufacturing drawings for tooling and equipment. Winchester also lined up a number of firms to sub-contract the manufacture of many parts that could be acquired faster and cheaper by using outside sources.

Even as Winchester was tooling up to manufacture the carbine, the government realized that the demand for the new weapon would soon outpace Winchester's production capacity. In order to pave the way for other companies to produce carbines, the government purchased the manufacturing rights from Winchester for the sum of $868,000.

General Motor's Inland Manufacturing Division was granted a contract for carbine production on November 24, 1941. Winchester representatives assisted Inland in setting up its production program. Since Winchester was already heavily involved in Garand production, Inland was able to deliver its first carbines to the government two months earlier. The first Inland carbines were delivered in August of 1941 and Winchester's carbines began to come off the assembly line in October of the same year.

After America entered World War II on December 8, 1941, the already high demand for military weaponry increased dramatically and the newly adopted carbine was no exception. Since the carbine was intended primarily to arm rear echelon and support troops and since such personnel outnumbered actual combat soldiers by a large margin, it was soon apparent that very large numbers of carbines would be needed in a hurry.

To increase carbine production to the required levels, the government sought out additional contractors and the Carbine Industry Integration Committee was formed to coordinate production of the weapon among the various manufacturers. The production of the M1 carbine was a truly amazing feat, and the government was faced with the problem of overproduction well before the end of the war! Eventually some 6,221,220 carbines were manufactured from late 1941 until mid-1945, when production ceased. As can be seen, there were approximately two million more carbines than Garands produced during World War II.

Of the 10 firms granted carbine production contracts, only one was unable to successfully complete its contract. The firms involved in carbine production rep-

A Marine preparing to rush much-needed ammunition to a machine gun position. He is carrying an early issue M1 carbine.
(U.S. Marine Corps)

resented an interesting cross section of American industry.

(1) *Winchester Repeating Firearms Company,* New Haven, Connecticut. Winchester, the developer of the M1 carbine, produced some 828,059 carbines, about 13.5 percent of the total production. Winchester was the only firm to have previously manufactured firearms.

(2) *Inland Manufacturing Division of General Motors,* Dayton, Ohio. Inland, which produced automotive related products, was the largest producer of carbines and turned out 2,632,097 of the weapons which represented approximately 43 percent of the total.

(3) *Underwood-Elliot-Fisher,* Hartford, Connecticut. Underwood was a well-known producer of typewriters and related business equipment. Underwood produced 545,616 carbines, approximately 8.9 percent of total production.

(4) *Rock-Ola Manufacturing Corporation,* Chicago, Illinois. This firm manufactured juke boxes and related novelty machines. Rock-Ola eventually produced 228,500 carbines, 3.7 percent of the total production.

(5) *Quality Hardware Machinery Corporation,* Chicago, Illinois. Quality HMC was unusual in that it manufactured only one component part of the carbine, the receiver. In some cases, even that component was produced under sub-contract. Quality HMC delivered 359,666 carbines to the government, approximately 5.9 percent of the total.

(6) *National Postal Meter,* Rochester, New York. National Postal Meter produced a total of 413,017 carbines accounting for 6.8 percent of the total production.

(7) *Irwin-Pedersen Arms Company,* Grand Rapids, Michigan. Irwin-Pedersen was organized by the Irwin Brothers who owned an established furniture

plant in Grand Rapids. The backers recruited John Pedersen, the famous firearms designer, who had worked in conjunction with Remington for many years. It has been suggested that Pedersen's chief contribution to the fledgling company was his name, and this was probably true. In any event, Irwin-Pedersen was the only prime contractor not able to fulfill its government contract when it was cancelled and taken over by the Saginaw Steering Gear Division of General Motors. Irwin-Pedersen had completed only about 1,000 carbines, and none had been delivered to the government at the time of the cancellation. Saginaw utilized a number of unfinished Irwin-Pedersen receivers on some of their carbines. Irwin-Pedersen carbines are obviously the rarest of the 10 prime contractors, with less than 0.01 percent of the total.

(top) A group of cold GIs in a chow line during the Ardennes campaign (late 1944-early 1945). The soldier in front of the line has an M1 carbine slung on his back. The carbine became a widely used infantry weapon during World War II. (U.S. Army)
(bottom) U.S. Army litter party in the Pacific. The litter bearers are carrying M1 carbines, which were less burdensome than the much heavier rifles and submachine guns. (U.S. Army)

(8) *Standard Products,* Port Clinton, Ohio. Standard Products had originally accepted a contract for the manufacture of the M1903 rifle but before production could begin, the government requested that the company build the carbine instead as it was a higher priority weapon by this time. Standard Products turned out 247,100 carbines, roughly four percent of the total production.

(9) *International Business Machines,* Poughkeepsie, New York. IBM was a well-known maker of office machines. In addition to producing some 346,500 M1 carbines during World War II (approximately 5.7 percent of the total), IBM also turned out large numbers of M1918A2 Browning Automatic Rifles (BARs).

(10) *Saginaw Steering Gear Division of General Motors,* Saginaw and Grand Rapids, Michigan. Like Inland, Saginaw was a subsidiary of General Motors. The firm was the only carbine prime contractor to operate two separate plants since it took over the failed Irwin-Pedersen operation in Grand Rapids. Saginaw's two plants had a combined production of 517,212 M1 carbines, approximately 8.5 percent of the total production. This includes the carbines produced from Irwin-Pedersen receivers on hand when Saginaw took over the contract.

The U.S. Marine Corps and U.S. Navy adopted the M1 carbine soon after the Army and all branches were clamoring for more

Marine "War Dog" handler taking a well deserved rest on Iwo Jima with his M1 carbine close at hand. (U.S. Marine Corps)

of the weapons. As an example, a Marine Corps document dated January 19, 1942 requesting specific weaponry "....needed for the ensuing twelve (12) months requirements..." included 208,000 carbines, but only requested 10,000 Thompson submachine guns. The same document concluded with "...every effort be made to obtain increased quotas of carbine and carbine ammunition in order to expedite the above policy."

The results of early Marine Corps testing of the carbine by one of its legendary officers, Lewis "Chesty" Puller, revealed that

Lt. Col. Puller, after firing the carbine at Aberdeen, stated that he considered it an excellent combat weapon and could see no need for retaining submachine guns and pistols in combat units if they were armed with M1 rifles and M1 carbines.

The report went on to reveal that "...Col. Jones, commanding the 23d Marines, stated that he would prefer to have the carbine replace the submachine gun and pistol. Practically all officers seem to be in favor of getting rid of the pistol." The report concluded that "...a policy be established of gradually replacing all .45 caliber pistols and submachine guns in the Fleet Marine Force with M1 carbines or M1 rifles in that order of preference..."

The Army's position on the carbine was the same as that of the Marine Corps. While the carbine was intended to replace both the pistol and the submachine gun, it did neither. Even so, the carbine quickly found favor with a great many soldiers. According to one early World War II government report,

...Army Ordnance officers state that the carbine is one of the most popular weapons they have ever issued to the service...

This popularity of the carbine extended to combat troops as well as the rear echelon and support personnel. As large numbers of carbines became available, many front line combat troops used these weapons rather than service rifles with varying degrees of success. The "Report of Infantry Weapons in Combat" issued by the Marine Raider Battalion on New Georgia Island alluded to previously, stated,

Carbine, Cal. .30, M1....This weapon held up

very favorably, functioned well with but very few exceptions...

Combat veteran Lt. Col. John George was also very favorably impressed with the carbine as related in his book *Shots Fired in Anger.*

..The carbine turned out to be an ace weapon of this war, as far as I am concerned. It was light and handy, powerful, and reasonably accurate.....The great advantage was that it got a gun that could shoot into the hands of the average Infantryman. The pistol, as far as general usage is concerned, is a purely defensive weapon, accurate only when in the hands of an expert. The carbine performed moderately well in the hands of dubs. For many types of offensive fighting, such as sneak raids and infiltration tactics, it was often superior even to the M1.....

The appeal of the trim, fast firing carbine was easy to understand. Given the choice of the more powerful but heavier M1 Garand or the lightweight carbine, many soldiers opted for the latter. Once in combat, however, a number of veterans changed their opinions about the carbine. Many soldiers complained vehemently that the carbine lacked stopping power, was somewhat delicate or was inaccurate. The *History of U.S. Marine Corps Operations in World War II* quotes several passages regarding the carbine's lack of acceptance by some combat Marines.

American paratrooper training with an M1 carbine. Despite the fact that the M1A1 variant was developed for use by airborne troops, many paratroopers fought with the standard M1 carbine. (U.S. Army)

...The BARmen and riflemen...seemed very happy to discard their carbines and take up their former weapons..

On Saipan the M1 continued as an excellent weapon, more durable than the carbine, and, although much heavier, it was preferred by most Marines. A carbine bullet would not always stop an enemy soldier, and the weapon rusted too easily.

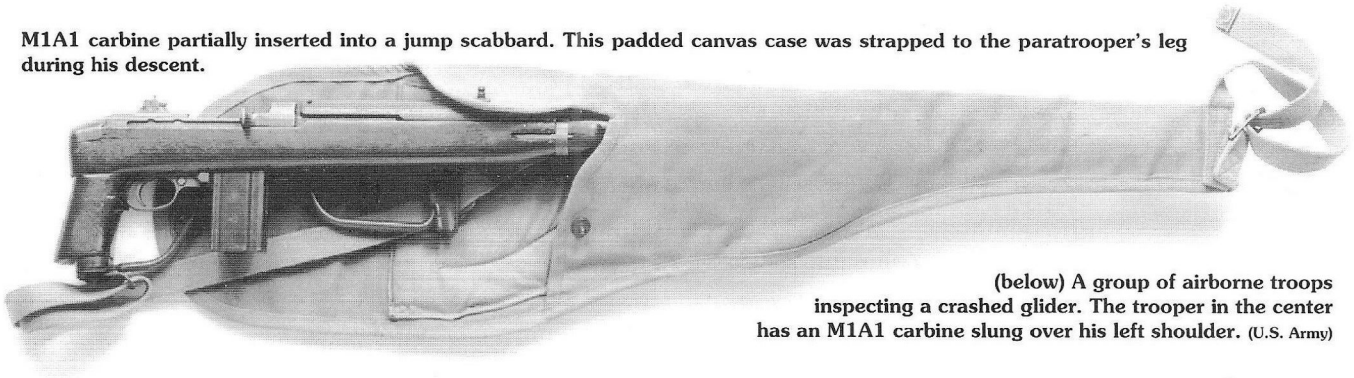
Another World War II veteran related the following incident.

A young U.S. Army sergeant went up a small ravine to relieve himself carrying his M1 carbine. He ran into a short, husky Jap infantryman coming down the same canyon. The Jap had a rifle with bayonet. They were about 30 or so yards apart and the Jap charged. The sergeant unlimbered his carbine from its "quick draw" inverted carrying position and it took him nine shots to send the Jap on to his ancestors. The sergeant never carried a carbine in combat again because he had completely lost faith in its ability to stop a hostile.

It seems that among World War II veterans, even those who used the weapon in actual combat situations, there was little middle ground regarding their opinion of the M1 carbine. They either loved the weapon or hated it.

While the carbine's fiercest critics certainly had legitimate complaints regarding its relative lack of power, range and accuracy, it should be pointed out they were actually comparing the carbine to the M1 rifle. Compared to the Garand, the carbine was certainly less powerful and less accurate. However, it should be remembered that the carbine was never intended to replace the rifle, but rather the pistol and submachine gun. Except for very close range situations in which the heavy .45 caliber slug offered greater stopping power, the carbine was a better all around performer than either weapon. As Col. George pointed out, only a real expert (a relatively rare creature) could accurately shoot a pistol, but almost anyone with even a modicum of training could effectively use the carbine. At ranges over 100 yards, the carbine was infinitely more effective than any submachine gun. It is doubtful that many of the soldiers who complained bitterly about the carbine as a combat weapon would have traded it for a pistol in most combat situations. The carbine's critics who denigrate the weapon for not always stopping an enemy when hit should ask themselves how many of the bad guys

M1A1 carbine partially inserted into a jump scabbard. This padded canvas case was strapped to the paratrooper's leg during his descent.



(below) A group of airborne troops inspecting a crashed glider. The trooper in the center has an M1A1 carbine slung over his left shoulder. (U.S. Army)

would have been touched at all if the shooter was firing a pistol or submachine gun. In almost all instances, the carbine was only lacking as a combat weapon when compared with a rifle. Its drawbacks aside, the carbine accounted for many enemy casualties. As Paul Wahl stated in his *Carbine Handbook,* "There are many thousands of graves full of proof that the M1 Carbine is an effective military weapon—that is, an efficient man-killer."

As supplies of the carbine reached a level to allow widespread issue, the weapon appeared on the front lines in ever-increasing numbers. A Marine Corps memo to the Commandant dated January 26, 1943 addressed the procurement of carbines.

Carbine and carbine ammunition are being received at an increasing rate which, while still small, should be sufficient to take care of new organizations for the present and soon permit the gradual replacement of Reising submachine guns which have been substituted for it in other organizations.

By 1943, the allotted number of carbines for a Marine Division was 11,074, and the number was only slightly less (10,371) by 1945. Army Tables of Equipment called for similar numbers of carbines. All branches of the United States military acquired and used carbines to a much greater extent than envisioned by the original proponents of the weapon, who intended it chiefly as an auxiliary weapon.

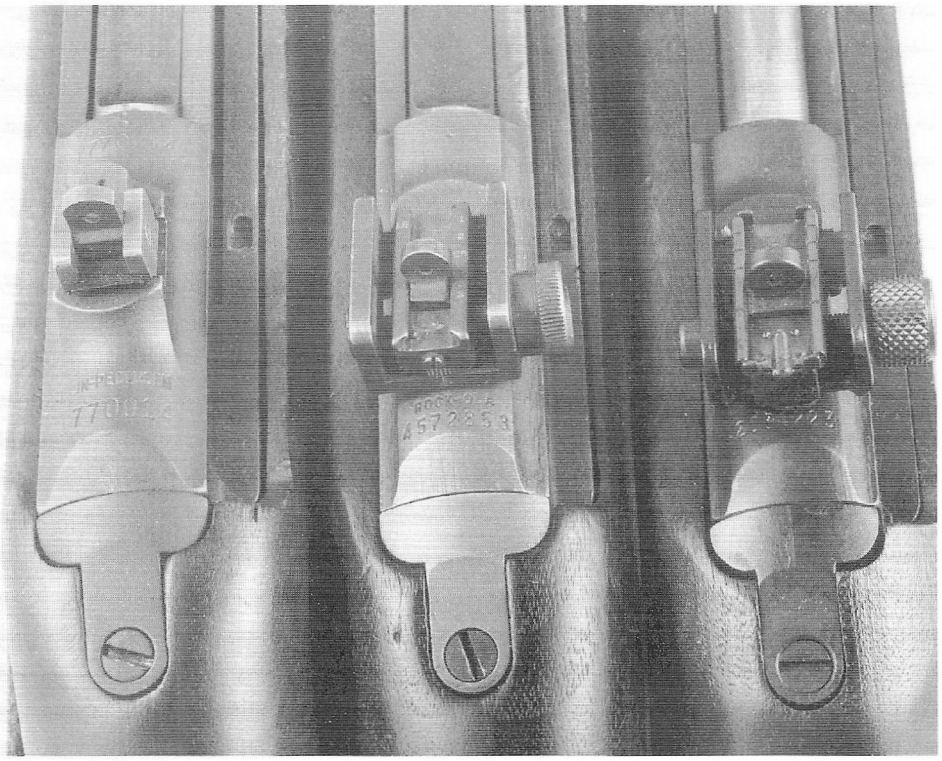
In order to meet the needs of airborne troops, a carbine with a folding metal buttstock was adopted in May of 1942 as the M1A1 and deliveries began in October of the same year.

M1 carbine shown above an M1A1 carbine with the stock folded.

(above) U.S. Army paratroopers sending a message via a homing pigeon. Note the M1A1 carbine, stock folded, resting on the pigeon cage. (U.S. Army)

(above, right) U.S. paratroopers in France, 1944. Note the folding stock M1A1 carbines. The M1A1 carbine was the Army's only small arm of WWII designed for airborne use. Note also the M3 trench knife in a plastic M8 scabbard strapped to the leg of the trooper at the far left. (U.S. Army)

(right) Army troops in Europe with a variety of infantry weapons. These include the M1A1 carbine at far left, an M1 rifle with an attached M7 grenade launcher, a jeep-mounted M1919A4 .30 cal. machine gun and an M3 trench knife in an M6 sheath. (U.S. Army)



M1 carbine rear sights.

(left) Early L-type flip sight (non-adjustable).

(center) Adjustable sight, milled construction.

(right) Adjustable sight, stamped construction.

The action of the M1A1 carbine was identical to the standard M1 carbine and only the folding stock mechanism differed. The M1A1 carbine was intended to be carried in a canvas scabbard, which was strapped to the leg of the paratrooper during his parachute descent and would be instantly available when he hit the ground. The sole manufacturer of the M1A1 carbine was Inland Manufacturing Division of General Motors which made 140,591 during World War II. It is interesting to note that other than the Marine Corps' Model 55 Reising submachine gun (to be discussed later), the M1A1 carbine was the only American World War II small arm specifically designed for paratroopers. The M1A1 carbine was used in virtually every American airborne combat operation of World War II.

As front line reports on the use of the carbine began to be analyzed some problems were identified. Other than the lack of short range stopping power alluded to previously, the following complaints about the carbine were also noted.

(1) The rear sight only had elevation increments for 150 and 300 yards and had no windage adjustment. This obviously could limit the carbine's accuracy at longer ranges.

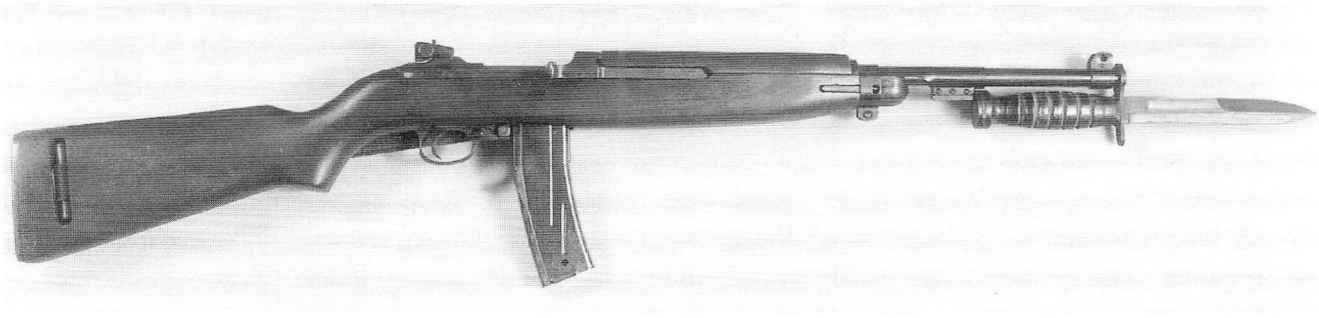
(2) The push button magazine release was often mistaken for the safety. This had the embarrassing, if not fatal, result of dropping the magazine from the weapon rather than releasing the safety.

(3) There was no provision for mounting a bayonet on the carbine. The merits of a bayonet on such a weapon can be debated, but this was still seen as something of a handicap.

(4) The carbine was not capable of full automatic fire.

As the firepower doctrine of warfare became even more important during World War II, many soldiers called for a selective-fire version of the carbine. Some carbines are reported to have been field modified to be capable of fully automatic operation.

These shortcomings were duly noted and modifications were tested to eliminate them. A rear sight with windage and elevation adjustments was developed and eventually adopted. A rotary safety to replace the unsatisfactory push button safety was likewise approved and placed into production. A wider front band assembly was used for a short time before being replaced by an improved barrel band assembly, the T4, which incorporated a bayonet lug. A special bayonet, the M4 Bayonet-Knife (discussed previously) was adopted for use with the T4 front band. These major production changes to the carbine are detailed in the Collector Notes segment. Virtually all of these improvements were adopted fairly late in the carbine's production run; not all of the manufacturers were able to incorporate these modifications into their production lines before their carbine contracts were cancelled. The overwhelming majority of carbines seeing service in World War II did not have any of these updated features, although they were added to the weapons during subsequent post-war arsenal rebuilds.



M2 carbine with M4 bayonet and 30-round magazine.

M2 Carbine

A selective-fire variant of the carbine, the M2, was adopted in 1945, and a 30-round magazine was standardized for use with this weapon. This magazine would also fit the standard M1 carbine. Inland and Winchester were the only makers of the M2 carbine because the other manufacturers had their contracts cancelled prior to the beginning of M2 production. Large numbers of standard M1 carbines were fitted with kits converting them to M2 type configuration after the war.

T3 Carbine

Another interesting variant of the carbine, which was procured in limited numbers late in the war, is the T3. This weapon was a semiautomatic carbine with a modified receiver designed to mount an infrared night vision scope. The T3 carbines and their infrared scopes saw some use in the Pacific Theater during the latter stages of the war. Like the M2 carbine, the only makers of the T3 were Winchester and Inland.

A grenade launcher, standardized as the M8, was adopted on March 4, 1943. The M8 grenade launcher was widely used since it allowed for semiautomatic operation of the carbine while attached, something which was not possible with the Garand's M7 grenade launcher. The M8 grenade launcher is discussed in a later section of this book.

By late 1944, the combined production of the prime contractors was more than ample to fill the remaining demand for carbines, and all of the contracts except for those of Winchester and Inland were cancelled. These two firms were the low cost contractors and both continued to manufacture carbines until production ceased in June of 1945. With the end of the war, the government had huge supplies of carbines on hand, and the weapon remained in front line service until the adoption of the M14 rifle in 1957. It still was part of the military's inventory throughout most of the Vietnam War, and hundreds of thousands were given away after World War II to various and sundry allies around the globe.

Despite some of the negative perceptions about the carbine alluded to previously, the weapon was the only American weapon of the war to be issued and used in comparable numbers to the M1 Garand. Compared to the M1, the carbine was indeed lacking in

WWII carbine accessories (clockwise).

Variety of boxed ammunition; FM 23-7 field manuals (two types); M4 bayonet with M8A1 scabbard; M8 grenade launcher; 15-round magazine and pouches (two types) and 30-round magazine and pouch.

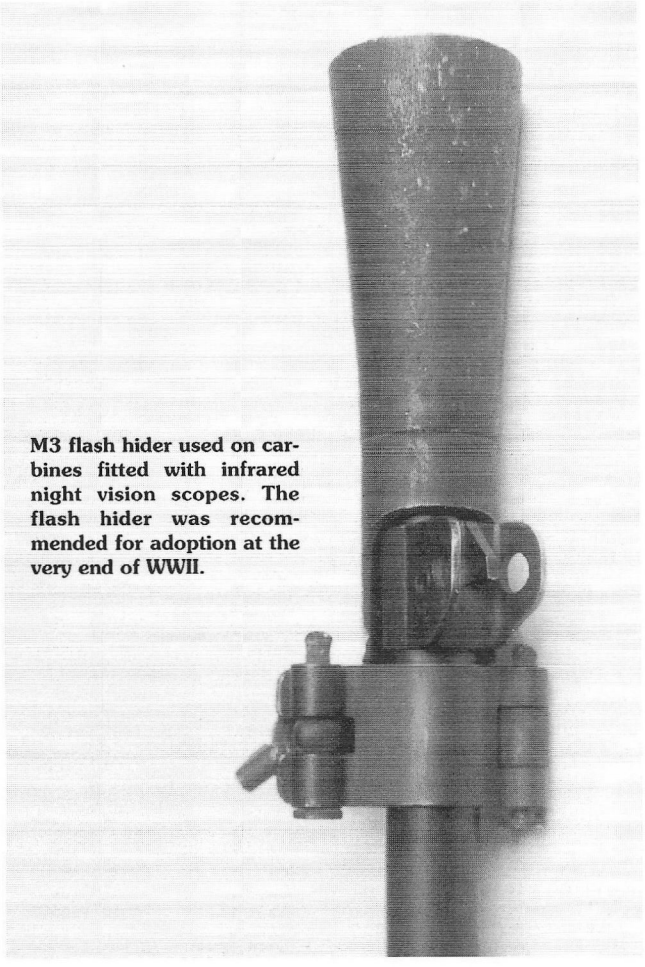
A member of the Army's 546th Engineer Detachment (Ft. Lewis, Washington) sighting a T3 carbine with infrared scope. This weapon saw limited but effective use in the latter stages of the Pacific war.
(Peter Senich)

some aspects. However, for its intended purposes, it served in a more than adequate manner. As stated by Paul Wahl in his *Carbine Handbook,*

The M1 Carbine proved to be the right answer to a problem facing the Army just before World War II: the need for a personal weapon, more effective than the .45 pistol, for the increasing ranks of special military personnel whom it was not practicable to arm with the standard rifle.....Only those who mistake it for a rifle will find it wanting.

The carbine has often been referred to as the soldier's pet weapon of the war and that is probably as apt a description of the carbine as any. The carbine's neat (almost sporting) appearance, light weight, handiness and rapid fire all combined to make it a very attractive package to large numbers of servicemen. Many would have loved to carry one of these trim little rifles home with them after separating from the service. Such certainly cannot be said about many other weapons that were used in deadly serious combat during the war and left behind with few regrets.

While it never succeeded in its original mission of replacing the pistol and the submachine gun, the carbine filled an important niche in our World War II small arms arsenal. Along with its equally famous and widely used counterpart, the M1 Garand, the M1 Carbine is truly a classic American weapon of the Second World War.



M3 flash hider used on carbines fitted with infrared night vision scopes. The flash hider was recommended for adoption at the very end of WWII.

Collector Notes

The M1 carbine has become extremely popular during the past decade or so with a great many collectors. The only significant release of U.S. government surplus carbines occurred in 1963, when approximately 240,000 of the weapons were sold to members of the National Rifle Association for $20 each through the auspices of the Director of Civilian Marksmanship (DCM). Most of these guns had been arsenal rebuilt since being manufactured during World War II and almost all will have the later features, such as adjustable rear sights and T4 barrel bands. The condition of the carbines sold through the NRA ranged from new to very good. During the past few years, large numbers of carbines supplied to various allies, particularly South Korea, have been purchased by American firms and shipped back into the country. Almost without exception, these carbines are found in poor condition, including refinished metal and rough (or replaced) stocks. The importing firm was required by government regulations to prominently stamp its name on the barrel. These imported carbines typically sell for significantly less than the much better conditioned NRA carbines that are in greater demand by collectors.

Given the fact that practically all of the carbines found on the market today are either the imports or the DCM guns, they will invariably have been altered from their original World War II factory configuration. Many collectors like to restore their carbines back to "as issued" configuration. However, restoration of a carbine is a more difficult undertaking than may be imagined. Not only do the correct parts for a particular vintage carbine have to be located, they must be marked properly to make a restored carbine "correct". It is beyond the scope of this book to detail the many and varied changes which occurred throughout the carbine's World War II production run. Anyone wishing to explore this subject in depth should consult my book *A Collector's Guide to the M1 Garand and M1 Carbine*. The following is a very general outline of the proper markings found on the component parts, as well as the major production changes that took place during World War II and some hints for a potential collector.

One of the key things to look for when evaluating a supposedly original World War II carbine are the markings on the component parts. Each manufacturer was assigned a code letter that was to be stamped on most parts.

Inland	"I"
Winchester	"W"
IBM	"B"
Underwood	"U"
Rock-Ola	"R"
Quality Hardware	"Q"
National Postal Meter	"N"
Irwin-Pedersen	"IP"
Standard Products	"S"
Saginaw (Saginaw Plant)	"SG"
Saginaw (Grand Rapids Plant)	"S'G'"

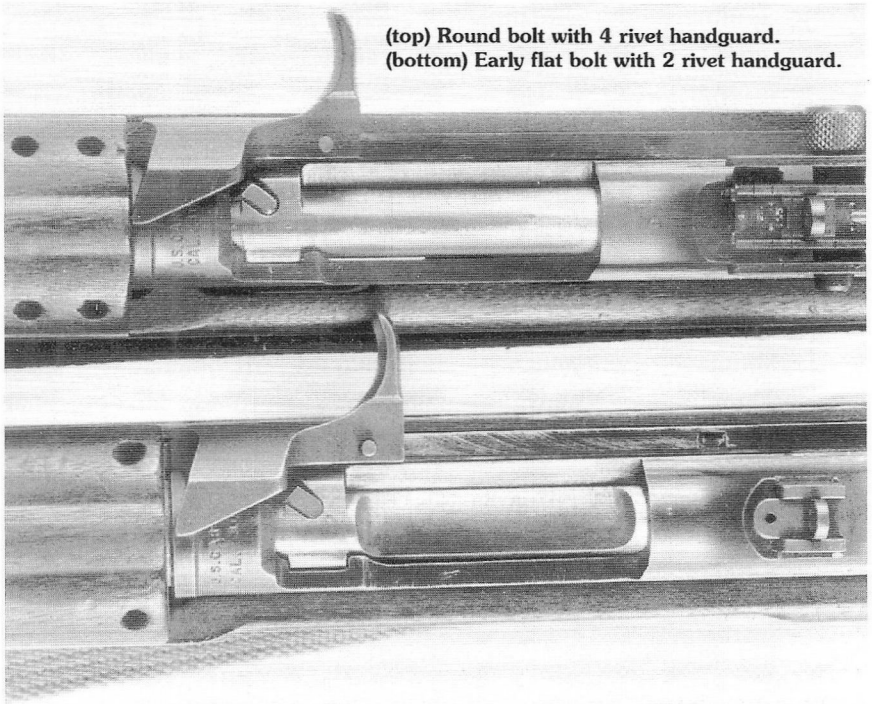
Each subcontractor was also assigned a code letter that was to be stamped on the parts produced by the firm next to the code letter of the prime contractor which ordered the part. For example, a stock furnished to Inland by one of its subcontractors, Overton Lumber Company, would be marked "IO" (*I*nland—*O*verton).

Since it is not possible to have a detailed examination of each and every part of the carbine in this book, we will concentrate on four or five key things to look for when attempting to determine if a particular carbine is in its original World War II configuration. While the presence of these features in no way is proof that the weapon remains in its "as issued" condition or that the weapon has been properly restored, the absence of them is assurance that the carbine has been altered from its original factory configuration to some degree. Most of the following components were used on practically all of the carbines fielded during World War II and the later type parts were only used late in production, if at all. After the war, these later parts were added to carbines during arsenal rebuild.

(1) *Rear Sight.* A very key feature to look for is the rear sight. The overwhelming majority of carbines issued during World War II were equipped with the L-type non-adjustable flip sight. Late production Winchester and Inland carbines left their factories with the later adjustable sights. It also appears that Rock-Ola, IBM, Standard Products, Quality Hardware and Saginaw used some adjustable sights *very late* in their production runs.

(2) *Bolt.* Another part to observe is the bolt. The vast majority of carbines were made with flat top bolts, but most of the contractors except Standard Products and IP/S'G' may have utilized some round top bolts very late in production. Round bolts will be most commonly encountered in Inland and Winchester carbines. All bolts were originally blued but many were subsequently parkerized during rebuild. The M2 carbine used only the round top bolt.

(3) *Safety.* Another very important feature is the safety. Only Winchester and Inland are known to have changed to the improved rotary safety on their late



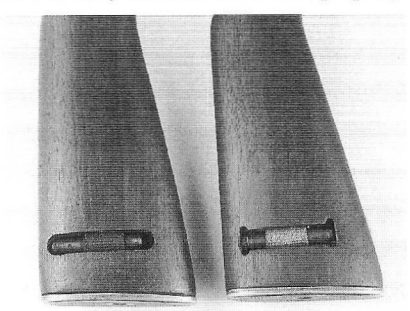
(top) Round bolt with 4 rivet handguard. (bottom) Early flat bolt with 2 rivet handguard.

carbines. All of the other prime contractors are believed to have used only the push-type safety.

(4) *Front Band.* Collectors have termed the three types of barrel bands used on the carbine during World War II as Type 1 (early narrow type), Type 2 (wider band with no bayonet lug) and Type 3 (latest variety with bayonet lug). These are not official designations. The vast majority of carbines used during World War II had the Type 1 band, but most makers except IP/S'G' are believed to have used the Type 2 band in later production guns. Only Winchester, Inland and, possibly, Quality Hardware are believed to have incorporated the later Type 3 band into their late production carbines.

It should not be inferred that the above-enumerated parts are the only ones about which a collector need be concerned. On the contrary, virtually every part needs to be examined in detail to ascertain if it is correct and proper for a particular carbine. There were changes to practically every one of the carbine's parts during the weapon's production run in addition to those detailed above. In order to properly evaluate a carbine, such items as the hammer, magazine catch, sear, trigger, operating slide, trigger housing, recoil plate and nearly every other part need to be examined. However, identifying such parts generally entails taking apart the carbine, which is not always possible at a gun show. The key features detailed can be distinguished without even picking up the carbine, in most cases. Of course, there is no substitute for a detailed examination by a knowledgeable collector before a sale is consummated.

Other features, such as high wood in front of the operating slide recess, are indicative of early production, but almost all makers changed to the low wood pattern during production. Very early carbine stocks were made with a slightly different shaped sling recess cut-out. Dubbed "I-cut" stocks by today's collectors, these are highly prized for restoration of early carbines. Likewise, properly marked parts, including stocks, early safeties and early rear sights are much in demand today for restoration purposes. As stated, not only do the parts need to be of the proper configuration, they must have the correct code markings.



Oval cut versions to left of I-cut example.

The increased collector interest in carbines over the past decade has resulted in a definite shortage of early replacement parts, which has dramatically increased the price of both original configuration as well as properly restored carbines. A correctly restored carbine is a desirable item, but one should not pay as much for such a weapon as for an original carbine. *Caveat Emptor.*

M1A1

The folding stock M1A1 carbine is quite popular with collectors today. Unfortunately, the vast majority of M1A1 stocks found for sale today are fakes (or, more charitably, reproductions). There are several things to look for when attempting to determine if a particular M1A1 carbine is original. To begin with, the only manufacturer of the M1A1 variant was Inland. Of course, during rebuild, any make of carbine could be easily installed in a M1A1 stock, but if one wishes an "as issued" weapon, only an Inland would be correct. There are no differences between the M1A1 carbine and Inland M1 carbines of like vintage except for the stock. Most M1A1 stocks were of the earlier high wood variety although some of the late production guns had factory low wood. Many of the earlier stocks were modified to low wood configuration during rebuild. Such stocks should have the arsenal rebuild marks.

The key points to observe on the stocks are the presence of a "OI" marking inside the bottom of the barrel channel of the wooden stock. A similar marking should be found on the bottom of the pistol grip although a few were marked "RI/3" in this area (believed to be made by Royal Typewriters for Inland). A very key area to observe is the inside of the buttplate. Original M1A1 buttplates will have cast-in numbers in this area (typically "B257614*") followed by a one or two digit number. This marking is usually somewhat indistinct and close observation is often necessary. Reproduction stocks will not have this marking, although some fake M1A1 buttplates with deeply stamped numbers have occasionally been seen.

M2

Original M2 carbines are not very common and are quite desirable weapons. Such guns are easy to recognize as they were only made by Inland and Winchester and were marked "M2" on the receiver ring in place of the standard "M1" marking. After World War II, many thousands of M1 carbines were rebuilt by various government arsenals into M2 configuration, and many had a "2" over-stamped in place of the "1". Such guns can be of any manufacturer and are much more common and less desirable than the original M2s for collecting purposes. The M2 carbine is capable of fully automatic fire and the possession of such a weapon is subject to very stringent federal regulations. These regulations are examined later in this book.

One important carbine accessory that is often overlooked is the sling. Prior to late 1944, the carbine was issued with a sling constructed of khaki colored material. Later in the war this was changed to an olive green coloring. Post-WWII carbine slings were made of a heavier weight canvas material and are much darker than the WWII o.d. slings. The metal tabs on the end of the WWII-vintage slings also differ from the post-war variety. The khaki slings are getting to be quite hard to find and are sought after by collectors today. Some fakes have appeared on the market in the past couple of years. Another interesting accessory is the leather scabbard somewhat similar to that made for the M1 Garand rifle. This item was used to carry the carbine on jeeps and other vehicles. The canvas leg scabbard used with the M1A1 folding stock carbine is a popular item today and is also getting harder to find.

Carbine collecting has grown steadily in popularity over the past decade and doesn't appear to have abated much. Collector-grade examples are steadily climbing in price, and the low priced "reimports" are introducing many beginning collectors to the field.

As with the M1 Garand, no World War II U.S. martial arms collection can be complete without at least one example of the M1 carbine. While the carbine never succeeded in its original goal of replacing the pistol, it nevertheless increased the firepower of the United States armed forces to a great degree. The carbine's use in huge numbers during the war and its popularity with the majority of its users combine to make it one of the classic weapons of the war. While the feeling may not be unanimous, many World War II vets remember the trim little carbine with a great deal of affection.

Photo taken April 1, 1945, on Okinawa. The Marine preparing to go over the seawall is carrying a Winchester Model 12 trench gun. (U.S. Marine Corps)

Combat Shotguns

Not all of the combat weapons employed during World War II were made in huge quantities like the M1 rifle and M1 carbine. As we have seen, both the Garand and carbine were made in staggering numbers and saw extremely widespread issue and use during World War II. Another much less known, but equally interesting, weapon is the combat shotgun. Only a small fraction of shotguns were procured by the United States military during World War II as compared to the Garand and carbine and some people may not even be aware that the weapons were employed in front line fighting during the war. Some veterans of World War II, particularly those who served in Europe, did not use shotguns or even encounter them at all. On the other hand, many veterans of the Pacific Theater, especially Marines, are well aware of the shotgun's role in the war and its value in many combat situations.

The use of shotguns for combat in America is as old as the history of our nation. During the Revolutionary War, multiple buck and ball loads were commonly used in the smooth-bore muskets of the day, and many colonists utilized their privately owned fowling pieces. Shotguns were used in the Seminole Wars and the war with Mexico. During the Civil War, the double barrel shotgun was widely used by Confederate cavalry units and a few Northern troopers as well. During the Indian War period, many westward bound soldiers carried along their trusted double barrel shotguns.

Although many shotguns found their way into combat during these years, the United States government never officially adopted the weapon for combat use, and all of these guns were privately procured. A relatively small number of shotguns was purchased by the government for foraging purposes during the 1870s and 1880s, but these were not intended for combat.

Such was the situation until the United States became entangled in the Philippines after the conclusion of the Spanish-American War of 1898. Our standard issue Krag rifle and .38 Colt revolver were often found lacking in battling the fierce Moro tribesmen. The shotgun was seen as an ideal weapon for such use, and the government purchased a quantity of the new Winchester Model 1897 repeating slide action (pump) shotgun for issue in the Philippines as combat weapons. These immediately proved their value, which was duly noted by our ordnance people.

A few years later, when we entered the First World War in 1917, the United States military found itself fighting a bloody, stalemated trench war. Specialized weapons were necessary for such fighting and it was soon realized that the shotgun could be of great value in this type of combat. The War Department ordered that a combat version of the shotgun be developed that was capable of mounting a bayonet.

The tried and proven 12-gauge Winchester Model 1897 shotgun was selected to serve as the basis for the new breed of weapon. A ventilated metal handguard and bayonet adapter was developed that could be used with the standard M1917 Enfield rifle bayonet. The new weapon was adopted as the "Trench Gun, Model of 1917".

Winchester eventually delivered almost 20,000 trench guns to the government during World War I. Several thousand more trench guns were made by purchasing Model 97s from sporting good wholesalers and jobbers and converting them to trench gun configuration at government arsenals.

To supplement the Winchester Model 97 guns, the government contracted with Remington for a trench gun variant of its Model 10. The Remington model used an unusual wooden handguard rather than the ventilated metal type found on the Winchester. A few Winchester Model 12 trench guns are also believed to

WWII Trench Guns (left to right). Winchester Model 97; Winchester Model 12; Ithaca Model 37; Stevens Model 520-30; Stevens Model 620A. The M97 and M12 were the most widely used of the war.

have been produced during World War I.

Although the actual combat use of the trench gun was rather limited during the First World War, it demonstrated its worth in a number of engagements with the enemy. The German reaction against the new American weapon was very strong. The Germans alleged that the shotgun was banned under rules of international warfare and threatened to execute any American captured with such a weapon (or even the ammunition) in his possession. The American government responded with a firm promise of very strong and swift retaliation, and the matter was dropped with the exception of some periodic propaganda outbursts.

In addition to the trench guns, the government acquired a few plain barrel riot guns that were essentially identical to the trench guns but lacked the handguard/bayonet adapter assemblies. A quantity of long barrel shotguns was also procured for use in training aircraft crewmen in trap shooting in order to teach the fundamentals of leading a target. The precise number of these training shotguns is not known but was undoubtedly smaller than the number of combat shotguns.

After World War I, the shotgun remained in both the Army and Marine Corps inventories. Its use between the wars was generally limited to employment by the Marines in the "Banana Wars," China and similar hot spots around the globe.

Just a year or so prior to our involvement in the Second World War, an evaluation of the shotguns in our arsenal revealed that only 21,187 shotguns were on hand. Many of these were the long barrel guns used for training airmen. A number of the trench guns and riot guns were quite well worn, and replacements were clearly needed.

In early 1940, the Ordnance Department directed the Small Arms Division to determine what sources of combat shotguns were available other than from the Winchester Company. Since Remington had stopped production of the Model 10 a number of years earlier (although a few still remained in inventory), the Winchester Model 97 was the only military shotgun available in any appreciable numbers.

On August 7, 1941, the Office of Chief of Ordnance ordered the following shotguns as standardized (Order #17074) for combat and sporting (training and recreation) use.

Winchester Model 97
Winchester Model 12
Ithaca Model 37
Remington Model 31A
Savage M620

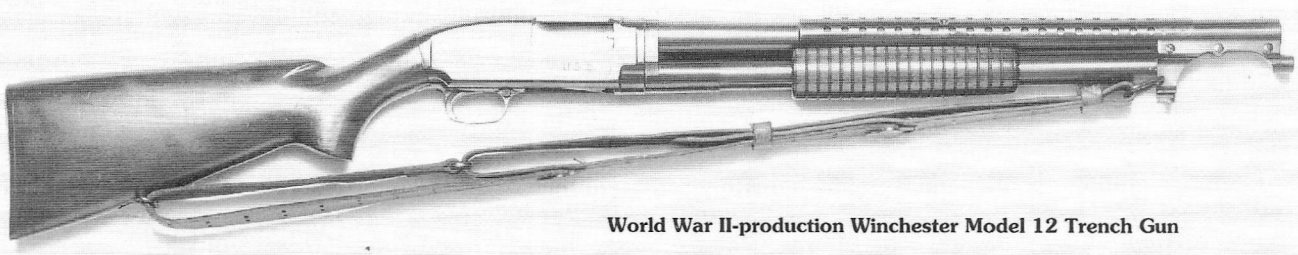
All five shotguns were then in commercial production, and the Ordnance Department determined that all of the manufacturers could provide shotguns in sufficient quantities.

Procurement of new shotguns began in November of 1941, when 1,494 Winchester Model 97 trench guns and 1,420 Ithaca Model 37 trench guns were ordered by the government. In addition, several thousand Remington Model 11 semiautomatic shotguns were acquired at the same time.

It should be noted that the official designation of trench gun generally dropped from use soon after the end of the First World War. After World War I, the military shotguns equipped with ventilated metal handguards and bayonet adapters were usually referred to as riot guns and specific reference was often made to the bayonet adapter. By the time of World War II, the trench guns were officially designated as "Shotgun, Riot Type, with Bayonet Attachment and Hand Guard." However, for the sake of clarity, the term "trench gun" will refer to the shotguns with the hand-

World War II-production Winchester Model 97 Trench Gun

World War II-production Winchester Model 97 Riot Gun



World War II-production Winchester Model 12 Trench Gun

World War II-production Winchester Model 12 Riot Gun

Two Marines armed with Winchester Model 97 trench guns advancing past knocked-out Japanese bunkers.
(U.S. Marine Corps)

guards and bayonet adapters and "riot gun" will refer to the plain barrel type. Both the trench guns and riot guns had barrels approximately 20" in length, while the training shotguns usually had 26" to 28" barrels.

After the United States entered World War II, the demand for all weapons, including shotguns, increased dramatically. Even though shotguns were rather low priority items, their usefulness soon became apparent, particularly in the Pacific Theater. One early World War II Marine Corps requisition, dated January 4, 1942, and requesting "riot type" shotguns and ammunition, stated that

The above items are requisitioned on the recommendation of officers who have recently returned from the Pacific Theater of action and who say that this type of gun has proven invaluable for duty in the field.

A Marine Corps report dated January 19, 1942, that estimated the number of various weapons needed for the "ensuing twelve (12) months requirements," called for "...8,000 riot shotguns."

Not all of the shotguns purchased by the government during World War II were employed in combat situations. Many of the weapons were utilized stateside for guard duty, prison use and other non-combatant duties. The use of shotguns for such roles enabled rifles and submachine guns to be available for overseas combat use. The shotgun was also employed overseas for guarding supplies and prisoners in addition to its combat role.

In order to help meet the demand for shotguns, the War Department authorized the purchase of commercial shotguns from the inventory of the manufacturers as well as such sources as sporting goods stores, hardware shops and other small retailers. Advertisements in newspapers and radio asking for donations of sporting shotguns also brought in a number of guns. Unfortunately, this Blanket Procurement did little to alleviate the shortage of shotguns since most of the guns obtained were non-standard types, such as double barrel, single shot and/or 16-gauge or other smaller bores, that had little application for military use. Some of the guns were used as training weapons, but it was soon apparent that the government had to have the needed combat shotguns manufactured.

The Ordnance Department contracted with several firms for production of military shotguns. Government records reveal that 68,808 riot guns, 13,405 trench guns and approximately 19,398 training shotguns were procured in 1942.

The 1943 production figures were 2,607 riot guns, 60,896 trench guns and 51,944 training shotguns. The following firms produced shotguns during World War II for the United States armed forces.

Winchester

Model 97 trench guns, riot guns and training guns
Model 12 trench guns, riot guns and training guns

Stevens

Model 520-30 trench guns, riot guns and training guns

Model 620A trench guns, riot guns and training guns

Ithaca

Model 37 trench guns, riot guns and training guns

Ithaca completed its military shotgun contracts before the end of 1942 to concentrate on production of the Model M1911A1 .45 pistol. World War II Ithaca Model 37 trench guns are very rare weapons since only 1,420 were manufactured.

Remington

Model 11 and Sportsman riot guns and training guns

Model 31 riot guns and training guns

Some of the Model 11 and Sportsman Remington training shotguns were equipped with adjustable choke devices.

Savage

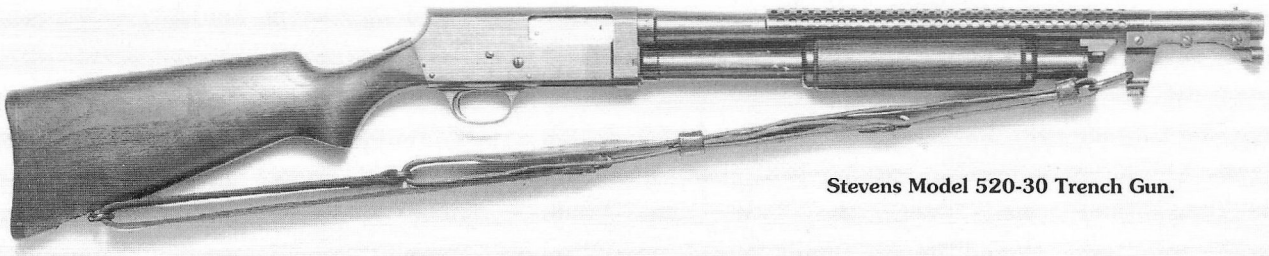
Model 720 riot guns and training guns

Along with the Remington Model 11 and Sportsman shotguns, the Savage was the only semiautomatic shotgun standardized during World War II.

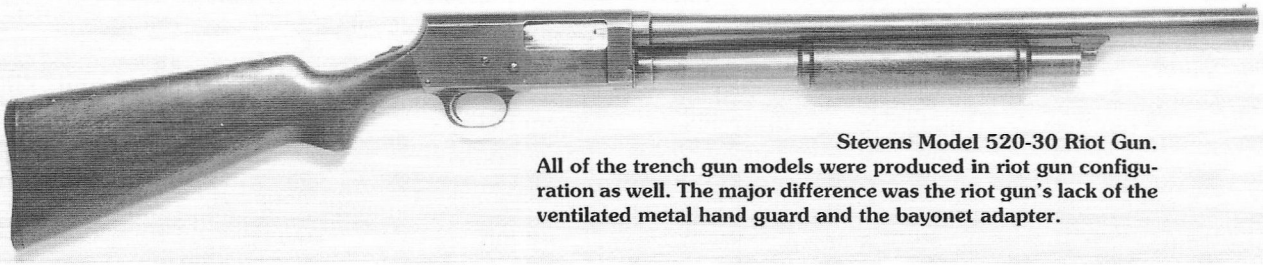
The Collector Notes section details the specific markings on the above shotguns and key features for each weapon.

Shotguns were used for combat purposes soon after America's entry into World War II. The Winchester trench guns were the most widely available guns and saw the greatest amount of combat use. In the European Theater, the U.S. Army acquired a few shotguns for such uses as guarding prisoners and other related tasks. The fast-moving mechanized warfare that was typical of combat in the ETO (with such notable exceptions as the hedgerows of France and some of the fighting in Italy) was not conducive to widespread use of shotguns.

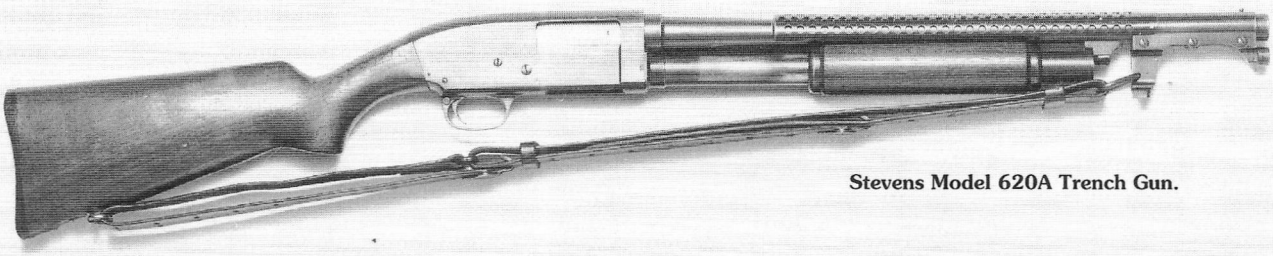
In the Pacific Theater, however, the situation couldn't have been more different. Shotguns were in the hands of the Marines in virtually every campaign of the war. Among the earliest uses of shotguns were the Makin Island operation, Tulagi and Guadalcanal. Later



Stevens Model 520-30 Trench Gun.



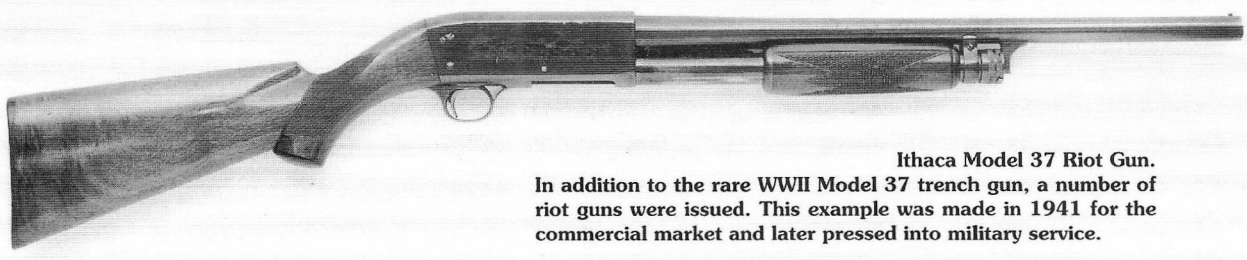
Stevens Model 520-30 Riot Gun.
All of the trench gun models were produced in riot gun configuration as well. The major difference was the riot gun's lack of the ventilated metal hand guard and the bayonet adapter.



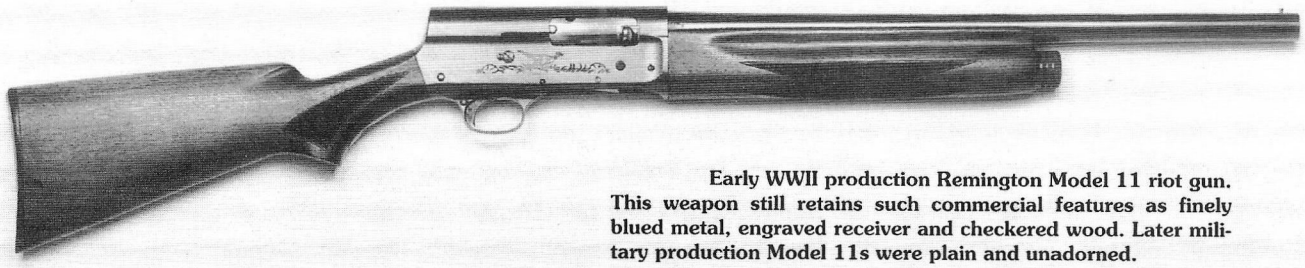
Stevens Model 620A Trench Gun.

Stevens Model 620A Riot Gun.

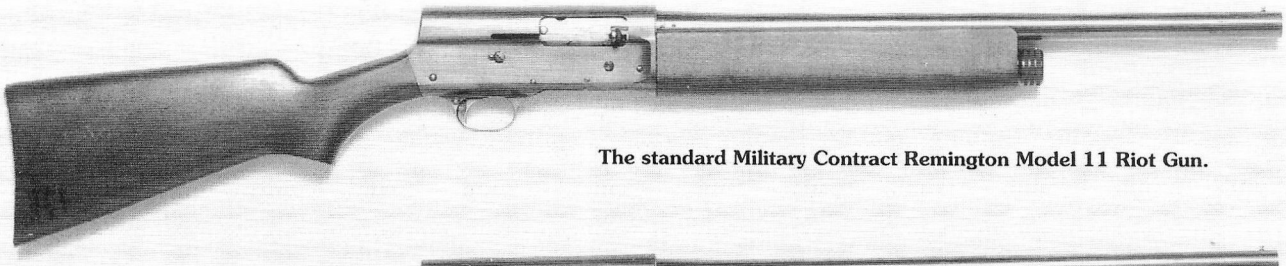
WWII production Ithaca Model 37 Trench Gun.
There were only 1,420 M37 trench guns produced during WWII and these weapons are rarely seen today.



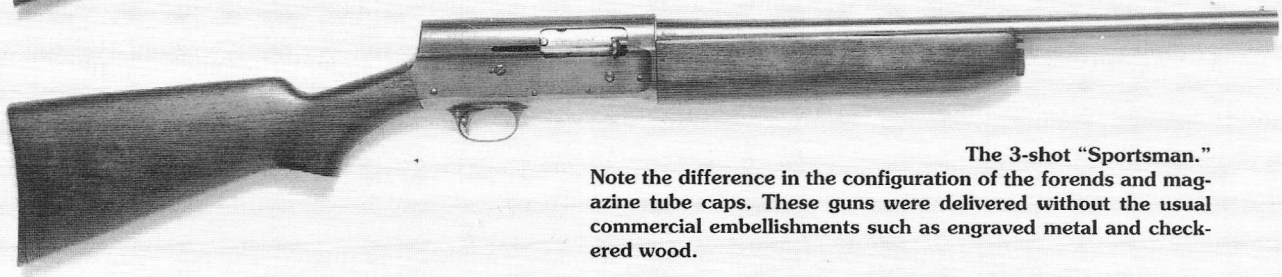
Ithaca Model 37 Riot Gun.
In addition to the rare WWII Model 37 trench gun, a number of riot guns were issued. This example was made in 1941 for the commercial market and later pressed into military service.



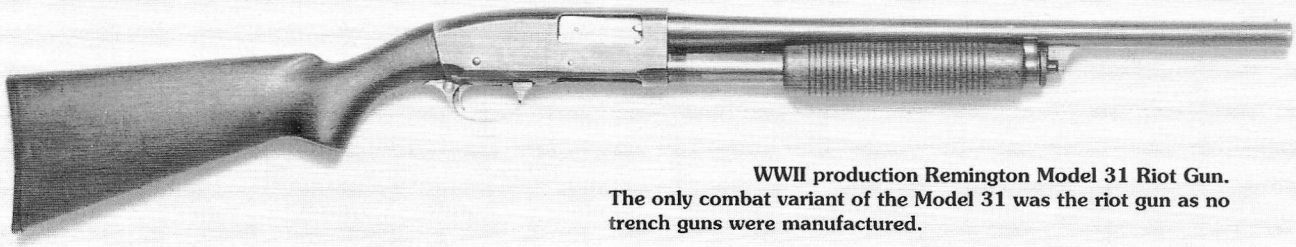
Early WWII production Remington Model 11 riot gun. This weapon still retains such commercial features as finely blued metal, engraved receiver and checkered wood. Later military production Model 11s were plain and unadorned.



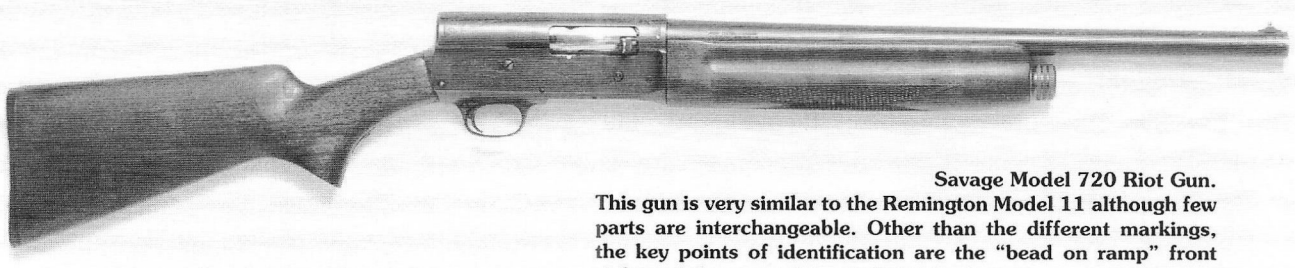
The standard Military Contract Remington Model 11 Riot Gun.



The 3-shot "Sportsman." Note the difference in the configuration of the forends and magazine tube caps. These guns were delivered without the usual commercial embellishments such as engraved metal and checkered wood.



WWII production Remington Model 31 Riot Gun. The only combat variant of the Model 31 was the riot gun as no trench guns were manufactured.



Savage Model 720 Riot Gun. This gun is very similar to the Remington Model 11 although few parts are interchangeable. Other than the different markings, the key points of identification are the "bead on ramp" front sight and the more elongated pistol grip.

(top left) A Scout-Sniper platoon of the Fifth Marines on Russell Island, 1944. Note the Winchester Model 12 trench gun in the hands of the Marine standing in the center. The others are armed with M1 carbines.
(National Archives)

(top right) Soldier in the Pacific during World War II. Note the Winchester Model 97 trench gun next to the M1928A1 Thompson submachine gun.
(U.S. Army)

(right) U.S. Army troops in Europe, winter of 1944-45, taking surrendering German troops into custody. The GI at the right, shown in dark silhouette, is armed with a Winchester Model 12 trench gun.
(U.S. Army)

battles in which shotguns were employed included New Georgia, Bougainville, the Marshalls, Kwajalein, Guam, Pelelui, the Marianas, Saipan, Iwo Jima and Okinawa. The jungle environment on many of the islands and the bunkers and cave complexes on others made the shotgun a very valuable close-combat weapon. As Thomas Swearengen points out in his book *The World's Fighting Shotguns,* "The only weapon superior to (the shotgun) in dealing with the Japanese massed banzai attack was the water-cooled machine gun."

The book *Semper Fi, Mac* contains a Marine's interesting anecdote about his use of a shotgun on Guadalcanal.

At the time I was carrying both a .45 pistol and a shotgun, figuring the scatter gun would be great for quick combat. You just don't have to worry much about aiming a shotgun. But let me tell you, while the shotgun can be great, it can also get you killed. You know the sound of one of those things is a lot different than that of a rifle. I'm sure most of those Nips had never heard a shotgun before I

opened up at the Metapona. Whatever, they came back to me as if I were the whole patrol. That's when I caught the bullet in my boot. After that I was very careful whenever I used my shotgun.

Both Army and Marine troops used shotguns effectively in the Pacific, although the Marines were the most ardent proponents of the weapon. The official number of shotguns authorized for a U.S. Marine Corps Division was 306. However, many units acquired shotguns and ammunition in greater numbers than their authorized allowance.

The shotgun's lack of range was its major handicap but this could be used as an advantage in some cases. The history of Marine Corps operations during World War II mentions the shotgun's lack of range as an asset in certain combat situations.

...Since the company charged with capturing Afetna Point would have to attack toward the flank of General Schmidt's division, about half the unit was issued shotguns. These short-range weapons would not be as dangerous as M1s to friendly troops, and their wide patterns of dispersion would make up for their comparative inaccuracy.

Night patrols and perimeter defense were the shotgun's forte. The weapon also proved to be invaluable in guarding machine gun positions from flank attack and was widely used in this role.

Most of the shotguns used in combat were the slide (pump) action trench guns but a number of the semi-automatic riot guns were also utilized. As stated in *The World's Fighting Shotguns,* "It is surprising how many of the short barrel Model 11 guns found their way into combat zones in the Pacific Theater of Operations. Many Japanese died for their Emperor in a storm of buckshot from these guns."

The only significant problem encountered with the shotguns issued in the Pacific was the susceptibility of the paper cased buckshot shells to moisture. This problem had occurred in the trenches of France during the First World War, and all-brass shells were ordered into production. However, the war ended before wide issuance of the brass buckshot shells could take place. When the shotguns were sent overseas during World War II, they were issued with standard commercial production paper cased shells. The ever-present moisture and dampness of the Pacific climate caused many problems in this regard. A Marine Corps document dated October 28, 1943, gave a brief synopsis of the various weapons issued to a Marine Raider battalion on New Georgia Island.

Riot Gun, 12 gauge. Could not be used, due to cardboard cased shells swelling from moisture to a larger diameter than the chamber of the gun. However, it is believed that if proper brass cased shells could be provided this weapon would be very valuable.

Contracts were negotiated in mid to late 1944 for all-brass 00 buckshot shells. This ammunition was formally standardized on March 29, 1945 as the "Shell, Shotgun, All Brass, 12-Gage, No. 00 Buck, M19." The brass shells were reserved for overseas combat use and the paper cased shells in inventory were restricted for guard and security use in the "zone of the interior" (stateside). The brass shells were sent overseas as soon as production and shipping resources allowed. However, little of this ammunition arrived in the combat zones until late in the war, and most of the combat use of shotguns was done with the paper cased shells.

By the end of 1944, there were sufficient numbers of shotguns on hand to meet the requirements. Shotguns were widely used in most of the latter battles of the war right up until the surrender of Japan in August of 1945. While the shotgun was never a large part of our World War II military arsenal, it provided valuable service and proved to be a useful and deadly weapon.

Collector Notes

Military shotguns have become very popular with collectors recently. The relatively small number of military shotguns available and the increasing demand has pushed the price steadily upward. The unfortunate problem of fakes is becoming more common, and it is important for a potential collector to know the basic features of the various World War II combat shotguns. Some variation, particularly in the type and placement of martial markings, may be seen, but most of the guns will generally conform to a standard pattern. All of the World War II military trench guns and riot guns had approximately 20" barrels, but some slight variance (¼" to ½") may be observed. Some of the long barrel training shotguns have had their barrels shortened to riot length. These can generally be spotted easily, since most of the manufacturers stamped the choke designation on the rear portion of the barrel. Original U.S. issue trench guns and riot guns had cylinder bore barrels typically designated with "Cyl" stamped on the rear of the barrel near the receiver. A "Full" or "Mod." (Modified) choke marking on a short barrel is absolute proof of a non-original barrel which would seriously detract from the value and price of such a shotgun.

Many guns appearing on the market today were arsenal rebuilt after World War II and will have such non-factory features as parkerized metal. A few of the longer barrel training guns were converted by government arsenals to either

riot or trench gun configuration. The choke markings on the barrels of these guns were neatly lined out and the "Cyl" marking over-stamped. The rebuilt military shotguns are often found in excellent condition and make fine collector items but are not as valuable or desirable as the factory original specimens. As with many of the other weapons we have discussed, these rebuilt shotguns can be identified because they generally had the initials of the arsenal facility stamped on the left side of the stock.

The Model 1917 bayonet discussed in the Edged Weapons section of this book was used with the World War I and World War II trench guns. A 12-round belt pouch made of web material was adopted and procured for issue with the Second World War shotguns. These are not often encountered today and are highly valued. They are marked "US" on the front and dated inside the cover. Similar post-WWII pouches will be encountered much more often and do not have anywhere near the value of the World War II pouches.

The trench guns and the few riot guns with sling swivels used the same type of slings as the service rifles; the leather M1907 and the web M1 being the most common.

Military issue shotgun ammunition, especially the brass case 00 buckshot, is getting to be scarce and is much in demand by collectors today. Since it is impossible to identify loose rounds as being military issue, shells in their original boxes are much more desirable.

The major characteristics of the World War II combat shotguns are presented below. Anyone wishing to explore the topic in depth should consult my book *A Collector's Guide to United States Combat Shotguns.*

Winchester Model 97 Trench Gun

The first thing to ascertain when examining a military issue Model 97 is the gun's vintage. The WWI Model 97 trench guns are much rarer than the World War II guns and identification is not difficult. The WWI trench guns were all of the solid frame pattern, whereas the Second World War guns were of the take-down variety. The martial markings ("US" and flaming bomb) were hand-stamped on the right side of the receiver of the World War I guns, whereas the WWII M97 markings were machine-stamped on the left side. The buttstock of 1917-1918 vintage guns had a thinner wrist and higher comb than the later guns.

The following features will be found on original issue WWII Winchester Model 97 trench guns.

Ventilated metal handguard and bayonet adapter.

Serial number range (approximate) 912000 - 960000.

Sling swivels.

Blued finish on external metal parts including handguard and adapter.

Martial Markings:

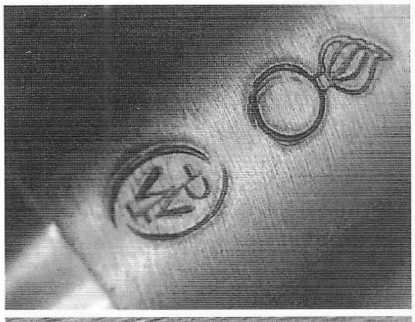
Barrel marked "CYL" on trench and riot guns.

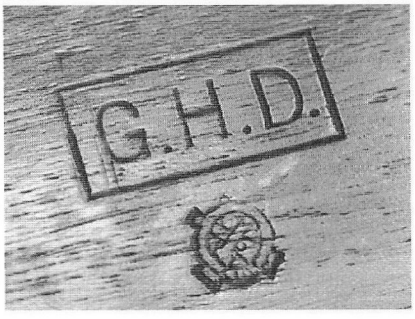
Small flaming bomb on top of barrel in front of receiver.

"U.S." on left side of receiver.

Large flaming bomb next to U.S. on receiver in later production guns.

Inspector cartouche on left side of stock; "WB" (Waldemar Broberg) or "GHD" (Guy H. Drewry).





Model 97 Riot Gun

Same features as trench gun but no ventilated metal handguard or bayonet adapter. Some early military riot guns had sling swivels, but most did not.

Winchester Model 12 Trench Gun

Ventilated metal handguard and bayonet adapter.

Serial Number Range (approximate) 939000-1040000.

Blued finish on all external parts including handguard and bayonet adapter. It is probable that very late production (over approximate serial number 1030000) Model 12 trench guns were finished in parkerizing at the factory. The late production Model 12 is the only World War II shotgun that was originally parkerized.

Sling swivels.

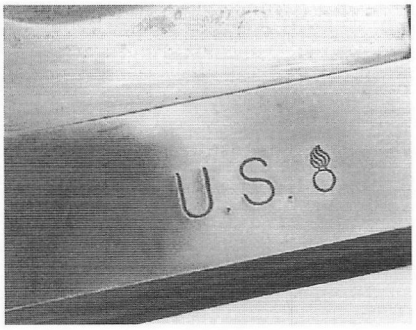
Martial Markings:

Barrel marked "Cyl."

Small flaming bomb in same position as on Model 97.

"U.S." and large flaming bomb on right side of receiver.

Same stock cartouches as found on Model 97.



Model 12 Riot Gun

Same features as trench gun. Like the Model 97, a few Model 12 riot guns had sling swivels but the majority did not.

Ithaca Model 37 Trench Gun

The Model 37 is, by far, the rarest U.S. production combat shotgun of World War II. Some trench guns were made during the Vietnam War but are easily distinguished from the rare World War II trench gun because they have parkerized finishes, different martial markings and much higher serial number ranges.

Serial number range (approximate) 58000 - 62000.

Ventilated metal handguard and bayonet adapter similar to the Winchester variety but attached to the gun in a somewhat different manner.

Blued finish.

Sling swivels.

Martial Markings:

Flaming bomb and "RLB" (Roy L. Bowlin) stamped on the left side of the receiver.

The Model 37's barrel was not stamped with the choke designation, but all of the manufacturer's information on the barrel can be read with the handguard in place on original trench guns.

No stock cartouche.

Ithaca Model 37 Riot Gun

Same as trench gun but no ventilated metal handguard, bayonet adapter or sling swivels. Some commercial Model 37s were converted by the government to riot guns. These will have different martial markings such as a flaming bomb on the barrel and "US" on the receiver and will exhibit such commercial features as engraved metal and checkered wood.

Stevens Model 520-30 Trench Gun

The salient feature of the Model 520-30 shotgun is the squared off profile of the rear portion of the receiver.

Serial number range (approximate) 38000 - 70000.

Ventilated metal handguard and bayonet adapter similar to the early Winchester type but marked with a small "s" (Stevens) on the bayonet lug. The bayonet adapter portion has an unusual anodized pinkish color.

Blued finish. The quality of the finish was a bit lower in later production guns but none were factory parkerized.

Sling swivels.

Martial Markings:

Small "US" on left side of the receiver and small flaming bomb on the left side of the barrel near the receiver.

No stock cartouche.

Barrel not marked with choke designation, but the manufacturer's markings on the barrel can be read with the handguard in place on original trench guns.

Stevens Model 520-30 Riot Gun

Same as trench guns but no ventilated metal handguard and bayonet adapter or sling swivels.

Stevens Model 620A Trench Gun

Although marked "620", most of the shotguns purchased under government contract were actually Model 620As. The 620A was mechanically identical to the Model 520-30 but had a streamlined receiver.

Same handguard as used with the M520-30 trench gun.

Serial number range (approximate); two blocks: 7200-9200, 17000-33000.

All features, including martial markings and blued finish, are the same as the Model 520-30 in later production guns. Some of the guns in the first serial number block were marked "United States Property" and "GHS" (Gilbert H. Stewart), but the later guns were marked in the same manner as the M520-30.

Stevens Model 620A Riot Gun

Same as trench gun except no handguard and bayonet adapter or sling swivels.

Remington Model 31 Riot Gun

Except for what is believed to be a single prototype, no Model 31 trench guns were produced. The military issue riot guns had the following features.

Serial number range (approximate) 51000 - 63000

Blued finish

No sling swivels

Martial Markings:

"U.S. Property" stamped on the left side of the receiver and the top of the barrel. Some Model 31 shotguns in the 60,000 serial number range are reported to be stamped with a flaming bomb and "RLB" in much the same manner as the Ithaca Model 37 trench gun.

Remington Model 11 and Sportsman Riot Guns

The recoiling barrel design of the Remington shotgun precluded a trench gun variant. The Model 11 had a total capacity of five rounds (four in the magazine and one in the chamber).

Serial number range (approximate); two blocks: 455000 - 500000, 700000 - 712000.

Blued finish. Many of these guns were parkerized when rebuilt, but there is no evidence to confirm any factory parkerization.

No sling swivels.

Martial Markings:

"U.S." and flaming bomb stamped on the left side of the receiver and on top of the barrel. Later production guns were marked "Military Finish" on the left side of the receiver.

Stock cartouche "FJA" (Frank J. Atwood) and "crossed cannons".

The barrel was marked "Cyl." on original riot guns.

Remington Sportsman Riot Gun

The Sportsman was essentially identical to the Model 11 except for having a capacity of only three rounds instead of five. It had the same features as the Model 11 except for a different shaped forend due to the smaller magazine. The bolt was stamped "Sportsman" rather than "Model 11".

As with the Ithaca Model 37 riot guns, a number of early issue Model 11 riot guns were converted from commercial production guns and will feature highly polished blued metal, engraved receivers and checkered wood.

Savage Model 720 Riot Gun

The Savage Model 720 was the same basic design as the Remington Model 11. It varied mainly in a few cosmetic differences and many of the parts were not interchangeable. Military issue Model 720 riot guns are much harder to find than Model 11s.

Serial number range (approximate) 69000-89000.

Blued finish. The quality of the bluing appears to have been reduced somewhat in later production guns. Many of the guns will exhibit engraved receivers and checkered wood although these features were eliminated on later production guns.

No sling swivels.

Martial Markings:

Small "U.S." and flaming bomb on the left side of the receiver.

Small flaming bomb on the left side of the barrel.

The choke designation of the Model 720 was identified by a series of asterisks. Original riot guns had cylinder bore barrels designated by three asterisks "***" on the left side of the barrel. In addition, original riot gun barrels had a "bead on ramp" front sight.

The combat shotguns of World War II are extremely interesting and collectible items. Their contributions in the war are often overlooked when compared to other weapons made in much larger numbers and used with much more frequency. However, whether it was used for guard or security duty or in front line combat service, the shotgun could be a formidable weapon. The shotgun deserves its rightful place alongside the other more familiar weapons of the war.

World War II combat shotgun accessories (clockwise). Model M1917 bayonet with WWII scabbard; shotshell pouch; TM 9-285 WWII shotgun manual; rare 25-round box of military all-brass 00 buckshot shells produced prior to adoption of the M19 designation; loose all-brass shells; 25-round box of commercial 00 buckshot overstamped "US PROPERTY"; 10-round box of later military M19 all-brass buckshot; TM 9-1285 WWII shotgun manual.

Submachine Guns

A unique class of weaponry widely used during World War II was the submachine gun. The term "submachine gun" was coined by the inventor of the famous Thompson submachine gun to identify a weapon that fired a pistol cartridge in a full-automatic mode. The first submachine guns appeared in the trenches of France during the First World War, when the German MP18/1 Bergmann (which fired the 9mm Parabellum pistol cartridge) was fielded in limited numbers beginning in 1916. By the end of the war, some 30,000 guns had been produced.

Although they did not have a major impact, it was seen that such a weapon could be of value in certain combat situations. Most of the belligerent nations began to evaluate submachine gun designs of their own. However, with the end of the war, the development of improved weapons either ceased or slowed down a great deal.

The Thompson Submachine Gun

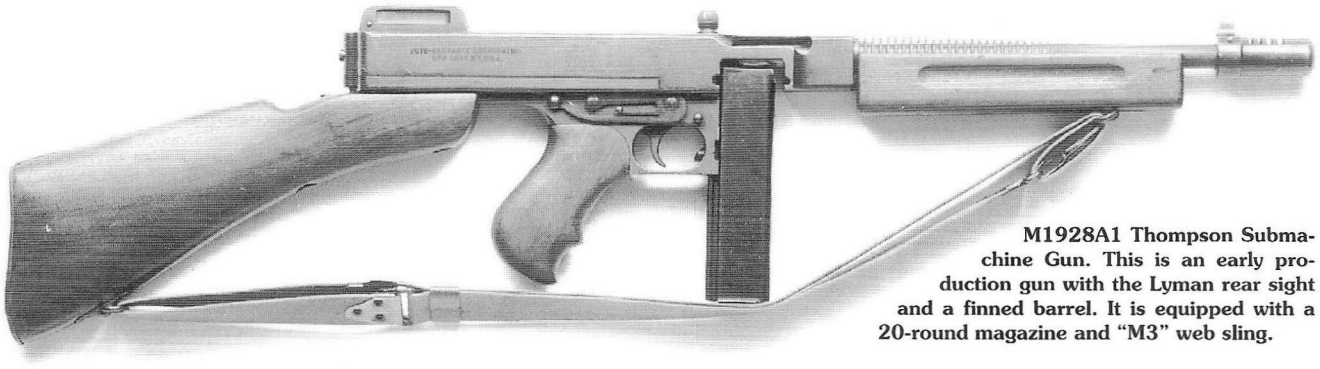
The United States Army was not particularly impressed with the concept of a submachine gun, and little ordnance research and development in this field was undertaken following the conclusion of World War I. However, a distinguished Ordnance Department officer who retired a couple of years before America's entry into that war felt that the submachine gun had the potential to be an extremely valuable weapon. John Taliaferro Thompson entered the U.S. Army after his graduation from West Point in 1882. He made a name for himself during the Spanish-American War of 1898 when he directed the supply of munitions during a time of near chaos in the Army's ordnance and quartermaster units. After the Spanish-American War, Thompson was a key player in the development of two legendary American military weapons, the M1903 Springfield rifle and the M1911 .45 pistol. He was recalled to active duty in late 1917 and was named Director of Arsenals and charged with supervising small arms production. The results of Thompson's efforts were very impressive, and he was awarded the Distinguished Service Medal. He was released from active duty in December of 1918.

After his final retirement, Thompson remained interested in the development of improved military weaponry. He designed a semiautomatic service rifle that was ultimately passed over in favor of the M1 Garand.

Thompson also became very interested in, if not obsessed with, the concept of a "trench broom," as he called it, for close quarter combat. He recognized that the .45 pistol cartridge, which he was instrumental in having adopted back in 1911, would be ideal for use in such a weapon. The heavy .45 caliber slug would provide a great deal of short range stopping power, particularly when fired from a fully automatic weapon.

While working on his semiautomatic rifle design, Thompson had become somewhat enamored with a locking mechanism developed by a U.S. Navy officer, John B. Blish. The Blish principle utilized a sliding wedge as a locking device. Thompson chose to adapt the Blish locking mechanism to his "trench broom" gun, which he was eventually to rename submachine gun.

With Thompson's sterling reputation, it was not difficult for him to obtain financial backing for his new



M1928A1 Thompson Submachine Gun. This is an early production gun with the Lyman rear sight and a finned barrel. It is equipped with a 20-round magazine and "M3" web sling.

gun. He assembled a talented team of designers and began work in earnest on the project. By 1919, the new firm Auto-Ordnance was busily involved in developing the first American submachine gun to see production. Several designs were evaluated including belt-fed mechanisms, but it was decided that box magazines and a rather novel drum magazine would offer the best service.

The most natural market for Thompson's new gun was, of course, the United States military. When he initially brought up the general concept of a submachine gun in 1917, a number of Ordnance Department officers expressed some interest. The Navy also thought that such a weapon might be of value for Marine and Navy landing party duties.

By early 1920, Auto-Ordnance was ready to have its prototype weapon tested by the government. On April 27, 1920, the Springfield Armory conducted preliminary functioning tests of the weapon. The results were very impressive, as 2,000 rounds were fired with only one stoppage.

The Marine Corps also tested the gun a few months later at Quantico, Virginia, and similarly favorable results were obtained. The new weapon was given a public demonstration at the National Matches in August of 1920, and the crowd came away very impressed.

Even though no official trials had been scheduled, Auto-Ordnance began plans to have the new weapon mass produced. Contracts were eventually negotiated with Colt for the manufacture of 15,000 "basic firing mechanisms" and with several other firms, including Lyman and Remington, for such items as sights and walnut stocks. The weapons were to be assembled by Auto-Ordnance at its own facility.

The new weapon was given the designation "Thompson Submachine Gun, Model of 1921." It was finished in Colt's attractive bluing and fired at a rate of approximately 800 rounds per minute, somewhat slower than the prototype design.

Both the Army and Marine Corps tested the M1921 Thompson, and although the results of the tests were favorable, adoption of the submachine gun was not recommended by either branch. The military was not particularly interested in acquiring any new weaponry in the early 1920s. Auto-Ordnance made a number of inquiries to foreign governments during this period, but few orders were forthcoming. The company had a little better luck with the commercial market even though sales were never very high. The Thompson submachine gun eventually gained a reputation as a gangster weapon due to its widely publicized use in the hands of the notorious criminals of the era, but the weapon was not as ubiquitous as the public may have been led to believe. Sales to law enforcement agencies increased as many municipalities, as well as the FBI, felt obliged to obtain Thompsons so as not to be outgunned by the crooks. Frankly speaking, the need for submachine guns by many law enforcement agencies during this period may have been more perceived than real.

Although the weapon had not been officially adopted, the Marine Corps obtained several hundred M1921 Thompsons for use in Nicaragua, where the weapon proved quite valuable in jungle fighting. A number of Thompsons were also issued to the Marines guarding the mail during a rash of armed robberies. The Navy eventually decided that the Thompson submachine gun would be a useful weapon in the arms racks of some of its vessels, particularly the Yangtze River gunboats patrolling Chinese waters.

Model of 1928 U.S. Navy Thompson Submachine Gun

In 1928, the Navy made plans to officially adopt the Thompson but requested a few modifications from the original M1921 design. Specifically, the Navy mandated a lower rate of fire (approximately 600 rounds per minute instead of 800), a horizontal foregrip instead of the vertical type used on the M1921

and a Cutts compensator. This latter feature had been available by special order on Thompsons for a couple of years. It helped to hold down the muzzle during firing by deflecting the muzzle blast downward. With these changes, the "U.S. Navy, Model of 1928" submachine gun was adopted. An order of 500 was placed with Auto-Ordnance which, along with the 340 M1921 Thompsons acquired previously, was enough to satisfy the limited demands of the U.S. Navy and Marine Corps for the foreseeable future. While not an extremely large number, the Navy order did a great deal toward keeping the fledgling and struggling company alive. It is interesting to note that the guns needed to fill the Navy order were from the original batch of 15,000 guns made by Colt in 1921. Indeed, these Colt-made guns were sufficient to meet the demand for Thompsons until the eve of World War II. The Model of 1921 marking had the "1" over-stamped to "8", but, except for the addition of a heavier actuator to reduce the rate of fire and the horizontal foregrip, the M1928 U.S. Navy Thompson retained the same features as found on the commercial Thompsons of the same era.

Model of 1928A1

The U.S. Army had shown even less interest in the Thompson than did the Navy. However, by the late 20s, the Army was in the process of acquiring mechanized vehicles such as tanks and scout cars to equip the Cavalry. It was recognized that the Thompson submachine gun would be ideal for use in such vehicles and in March of 1932, the U.S. Army standardized the weapon as "non-essential limited procurement." The Cavalry did not acquire any significant number of Thompsons, however, since it preferred to wait for the issue of the new semiautomatic rifle (the Garand) that was under development during this period. The Infantry saw no need for Thompsons whatsoever. When the M1 was finally adopted and issued, the Cavalry soon realized that the Thompson was a better weapon than the M1 rifle for its uses given the weapon's more compact size and greater firepower. In September of 1938, the Thompson was changed from Limited Procurement to Standard and designated as the "Submachine Gun, Caliber .45, Model of 1928A1." Even with its official adoption, the Thompson was relegated to use as an auxiliary weapon for the Cavalry, and little thought was given to its potential value as an infantry weapon.

The M1928A1 Thompson was issued with the same type of 20-round box magazine and the 50-round drum magazine as used with the M1921 and M1928 Navy models. A very heavy and cumbersome 100-round drum magazine had been produced previ-

Left side of M1928A1 Thompson submachine gun receiver. Note the fire and safety selector levers and the magazine release. Although marked "Model of 1928", this is actually an M1928A1.

Two views of the Cutts Compensator used on the M1928 and M1928A1 Thompson submachine guns.

ously for the commercial Thompsons in limited numbers, but none were procured by the government.

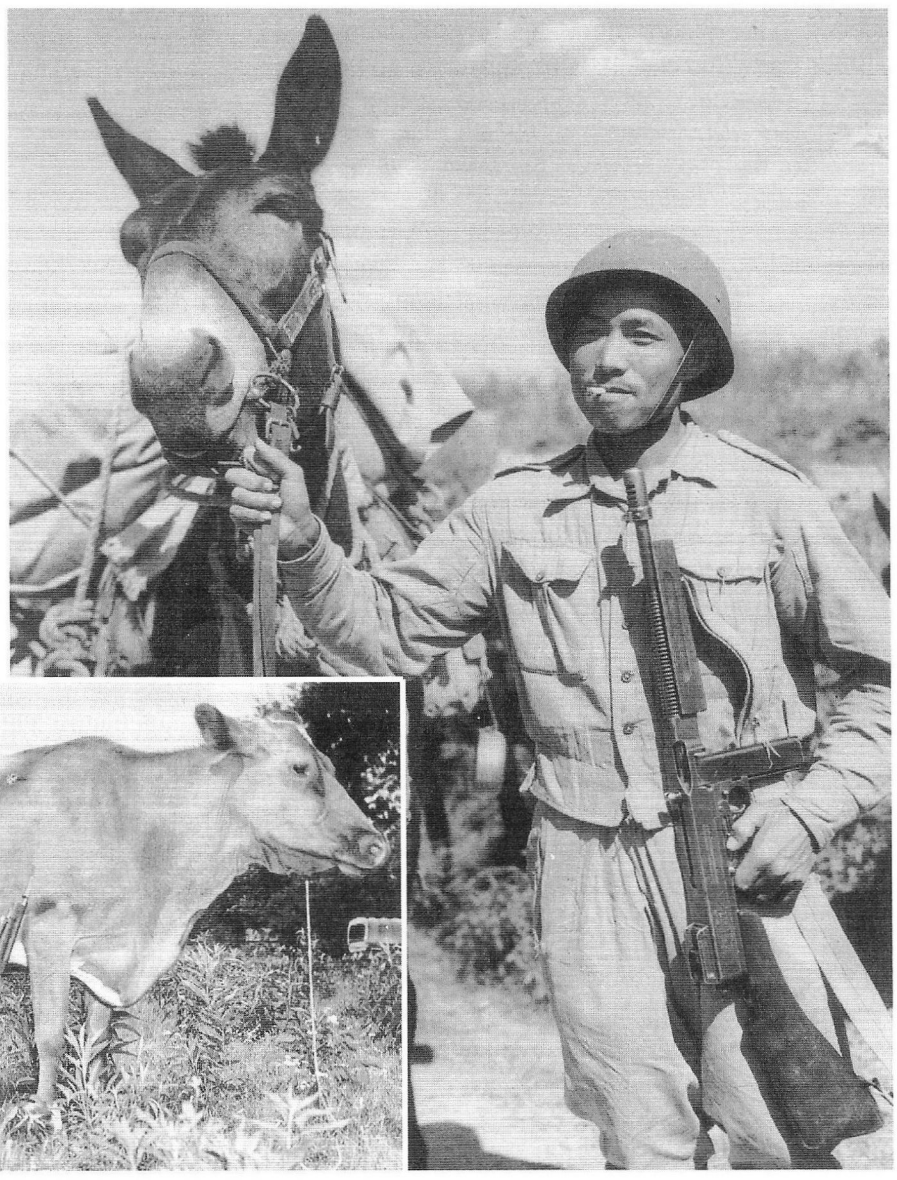
In June of 1939, the U.S. Army placed an order for 950 Thompsons with the Auto-Ordnance company. Since the inventory of the Colt-made guns was just about depleted by this time, Auto-Ordnance made plans to have M1928A1 Thompsons produced under license by the Savage Arms Company plant in Utica, New York. Gambling on increased orders from the United States as well as other countries due to the war breaking out in Europe, Auto-Ordnance wanted to have its own factory to manufacture Thompsons. An old brake-lining plant in Bridgeport, Connecticut, was acquired and renovated as an arms making facility.

The Auto-Ordnance Company had guessed right about the demand for Thompsons. By late 1940 the U.S. Army had placed orders for 20,405 additional M1928A1 submachine guns, and a year later the total amount of Thompsons ordered came to 319,000 guns. The first Thompsons from the Savage plant started to come off the assembly line in the spring of 1940, and the Bridgeport plant had begun to deliver guns by August of 1941. Many of the Thompsons ordered by the government were intended for allied nations, particularly Great Britain, under the Lend-Lease Program. Initially, the American military was somewhat slow in procuring Thompsons since it was felt that the new M1 carbine would supersede the sub-

machine gun. However, after Pearl Harbor, it was seen that both weapons would be needed and ever-increasing quantities of Thompsons were ordered. By February of 1942, some 500,000 M1928A1 Thompson submachine guns had been produced.

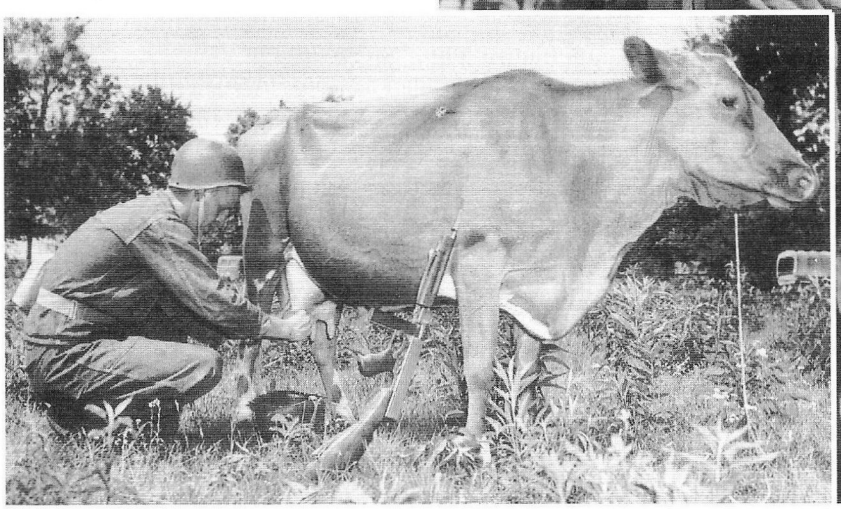
The Thompson submachine gun had acquired the nickname "Tommy Gun" early on and the name stuck to the weapon. Auto-Ordnance recognized the value of the nickname and soon patented it. Thompsons were referred to as Tommy Guns both in and out of military service, and the term became almost generic for all submachine guns.

The Thompson had the great advantage of being the only submachine gun in mass production in any of the allied nations during the early days of World War II. Great Britain made good use of the many thousands of Thompsons acquired under Lend-Lease, and the weapon was a favorite of the elite Commandos as well as other British units. These Lend-Lease M1928A1 Thompsons were essentially identical to the versions produced for the United States government except that the horizontal foregrip was replaced by the earlier vertical foregrip. In addition, the buttstock sling swivel was mounted on top of the stock rather than on the bottom in U.S. fashion. Very early production M1928A1 Thompsons used the English spelling "Calibre" on the receivers, although some of these were also acquired by the United States. Fairly large numbers of these Lend-Lease Thompsons have been reimported back into the United States since the end of World War II. They can be further identified by the typical British proofs on the receiver and barrel. Eventually, the Thompson would be supplanted by other submachine guns in British service, especially the Sten, but the Thompson remained in use by our allies throughout the war.



(right) Early World War II production M1928A1 Thompson. This view clearly shows the adjustable Lyman rear sight, the finned barrel and the slots on top of the Cutts compensator. (U.S. Army)

(below) Interesting photo of a U.S. soldier with his M1928A1 Thompson submachine gun "requisitioning" some supplies!
(U.S. Army)



With ever-increasing demand, the Auto-Ordnance engineering staff searched for ways to simplify the Thompson and increase its rate of production. The most obvious candidate for change was the finely made adjustable Lyman rear sight. This sight required much machining time and was quite expensive. Realistically speaking, such a sight was superfluous and overly complicated for use on a submachine gun. In December of 1941, a simple stamped sheet metal peep sight that was not capable of adjustment was approved for use on the Thompson. This change speeded up production and reduced the cost but did not materially affect the usefulness of the weapon.

Another feature that received some attention was the barrel cooling fins. These were finely finished on the commercial Thompsons but as production of the military contract guns continued, the fins were left squared-off and were eventually eliminated altogether. Again, this simplification had little or no negative impact on the gun's performance. The Thompson had a thick barrel in relation to its cartridge, and the fins were of marginal value in cooling the weapon.

Another manufacturing short-cut included the elimination of the checkering on the safety and fire selector levers. As production continued, these machined levers were replaced with simplified stick-type levers. These stick-type levers were not as easy to manipulate as the early levers, and the trade-off between manufacturing time and utility can be debated.

On later production guns, the finely checkered actuator knob was replaced by a smooth version. This feature had no negative impact on the performance of the weapon.

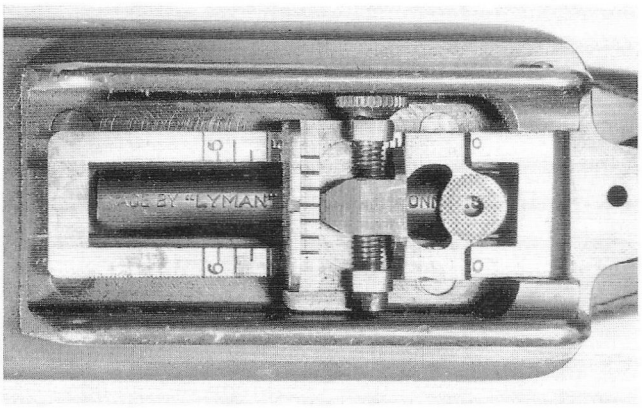
Another change in the M1928A1 Thompson was the addition of a metal reinforcing bolt, which was added to strengthen the buttstock.

These changes did not occur at once but were phased in over a period of time. M1928A1 Thompsons may be observed with all the production simplifications, only one or two of the simplifications or with none at all. The book *The Thompson Submachine Gun* divides the M1928A1 Thompson into three basic variants.

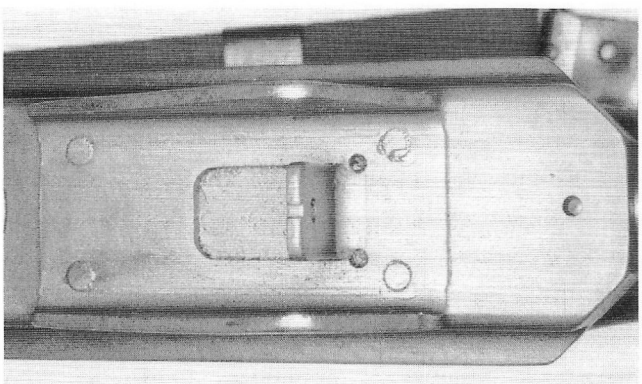
(1) with finned barrel, adjustable rear sight.
(2) with finned barrel, fixed rear sight.
(3) with smooth barrel, fixed rear sight.

Serial numbers aside, the general time frame that a M1928A1 Thompson was manufactured can be deduced by the configuration of the weapon in relation to the above major production changes. That is, the fewer the changes from the original design, the earlier the weapon was produced.

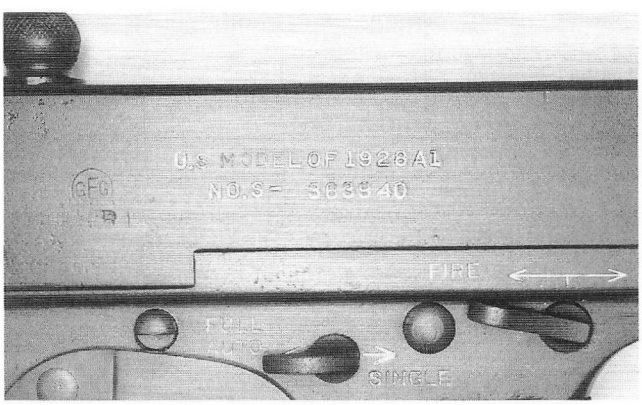
The M1928A1 Thompson was manufactured in greater numbers than any other variant of the weapon, with some 562,511 guns made between 1940 and early 1943. Of this figure, almost 300,000 M1928A1 Thompsons made during 1941 and 1942 were supplied to our allies, chiefly Great Britain. It has been reported that as many as 200,000 of these guns may have been lost enroute to England on cargo ships sunk by German submarines.



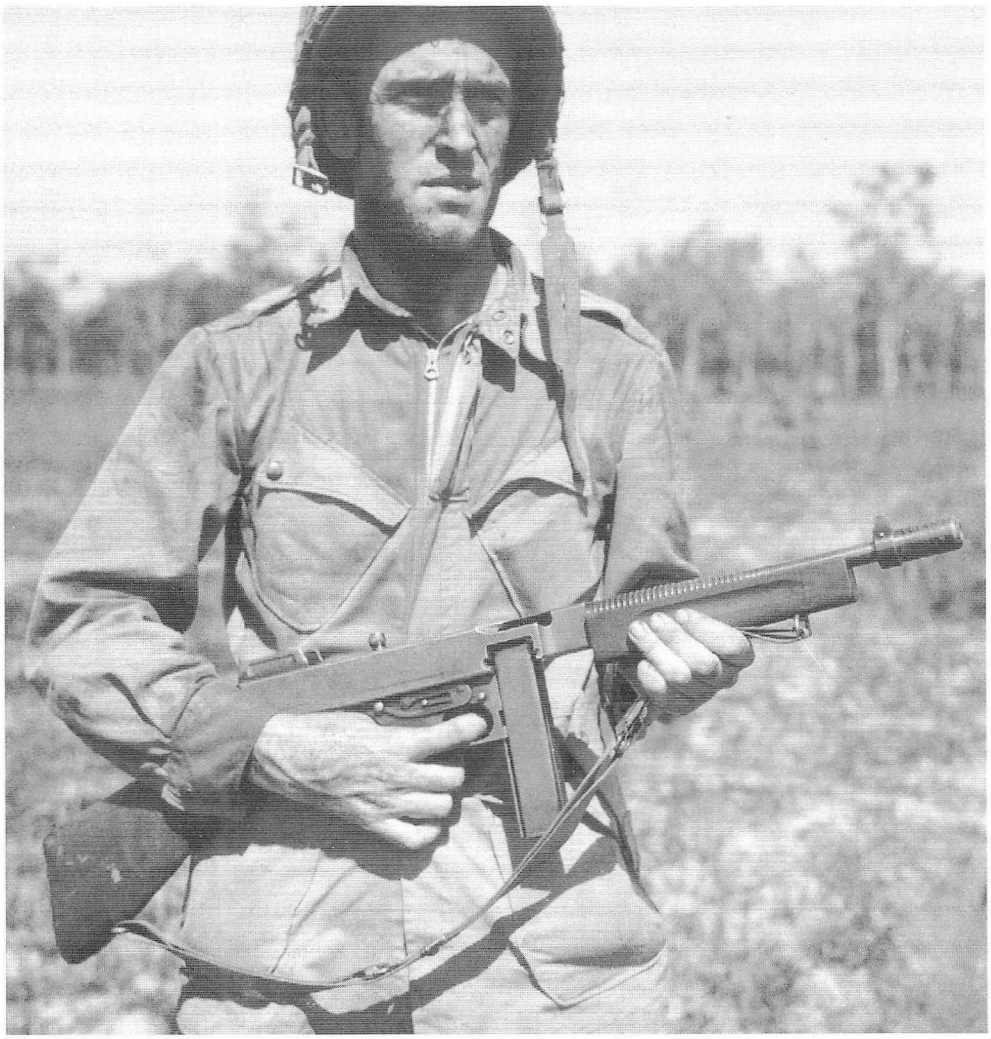
Top view of Lyman rear sight on M1928A1 Thompson. This finely crafted sight was unnecessary on a submachine gun.



Stamped rear sight as found on late production Thompsons. Note the protective "ears" on either side of the sight. (Garand Stand)



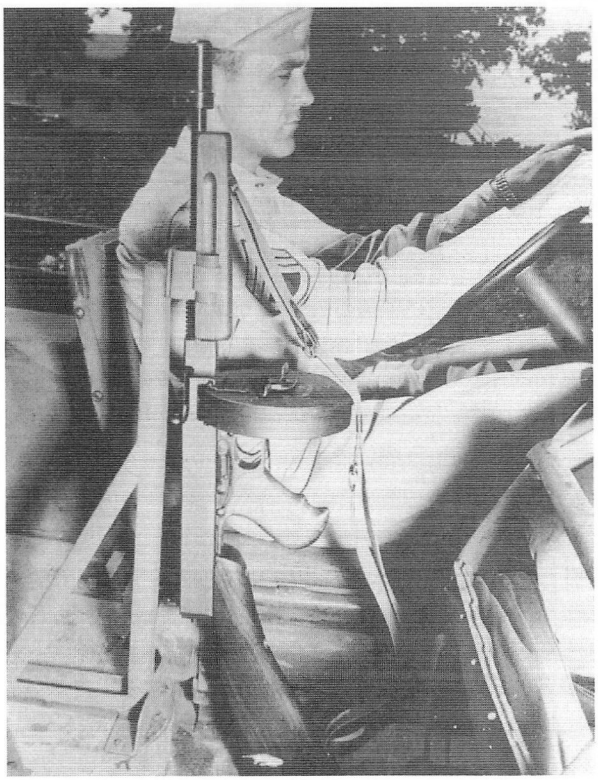
Typical M1928A1 receiver markings. This gun was made by Savage as determined by the "S" serial number prefix. Note the "GEG" (George E. Goll) inspection marking and the finely crafted milled fire selector and safety levers. (Garand Stand Collection)



(right) Typical early WWII production Thompson M1928A1 submachine gun with a 20-round magazine. Note the early type of rear sight and the finned barrel. (U.S. Army)

(bottom, left) A mid-production M1928A1 Thompson in a jeep rack. The gun has a 50-round drum magazine and M3 sling attached. Note the finned barrel and the stamped rear sight. (U.S. Army)

(bottom, right) A forlorn looking GI loading a number of 50-round Thompson drum magazines by candle light. His early production M1928A1 is resting against his right leg. (U.S. Army)



(left) Marines of the First Division, Wana Ridge, Okinawa, 1945. The Marine at left is firing an M1 Thompson submachine gun. The M1 was the first version of the simplified Thompsons. (U.S.M.C.) **(right) An American soldier guarding an ammunition dump. He is armed with an M1 Thompson with a 30-round magazine. Note the simple rear sight made of stamped sheet metal without the protective "ears" as was found on the later M1A1 variant.** (U.S. Army)

M1 Thompson

Even with these modifications, the basic mechanism remained unchanged. In order to make a significant impact upon reducing manufacturing time and cost, all aspects of the weapon had to be re-evaluated. The Savage engineering team proposed a radical redesign of the Thompson that centered around the elimination of the Blish locking device. The Blish lock was always of dubious value and required a great deal of machining time. Most of the contemporary submachine guns used a simple straight blowback system that was possible due to the use of low powered pistol cartridges. Savage assembled an experimental Thompson using the blowback mechanism and it worked quite well. Despite some initial resistance by the Auto-Ordnance Company, the merits of such a design were too great to overlook and a prototype was fabricated and tested by the Ordnance Department in early 1942. The redesigned Thompson functioned every bit as well as the M1928A1 and could be manufactured much faster and cheaper. The new weapon was adopted in April of 1942 as the "Submachine Gun, Caliber .45, M1."

The following changes were made in the M1 Thompson from the M1928A1:

(1) The M1 was a straight blowblack design and the Blish locking mechanism was eliminated.

(2) The cocking handle (actuator) was moved from the top of the receiver to the right side.

(3) The Cutts Compensator was eliminated.

(4) The removable buttstock of the M1928A1 was replaced by a permanently attached stock on the M1 variant.

(5) The M1 was not capable of accepting the drum magazine. Only box magazines could be used.

The M1 Thompson was put into production as soon as contractual commitments for the M1928A1 were completed. The M1 Thompson was produced in the fewest numbers of any of the variants, with a total of 285,480 made from early 1942 until early 1943. Later versions of the M1928A1 and the new M1 Thompson were produced concurrently for a short period of time.

M1A1 Thompson

The M1 Thompson was simplified even more by the substitution of a fixed firing pin on the face of the bolt rather than the separate hammer used with the M1928A1 and the M1 models. This change resulted in the adoption of the "Submachine Gun, Caliber .45. M1A1" in October of 1942, although the variant did not see full scale production until early 1943. Most of

Three views of an M1A1 Thompson submachine gun, including closeups of the stick-type fire selector and safety levers, and receiver markings. Note these guns don't have an "S" or "AO" prefix on the serial number to denote the manufacturer. (Garand Stand Collection)

the production models of the M1A1 incorporated metal guard "ears" on either side of the stamped rear sight to protect it from damage.

Almost twice as many M1A1 Thompsons were manufactured as M1s with a total production of 539,142 guns by the time production ceased in 1944. In addition, a number of the M1 models were converted to M1A1 configuration by ordnance depots and arsenals.

The elimination of certain features—the barrel cooling fins, the Blish locking mechanism, the Cutts compensator and the adjustable rear sight—had no real negative effect on the utility or performance of the weapon. Likewise, the fact that the simplified Thompsons could not be used with the drum magazine did not have a serious impact on the effectiveness of the weapon, although the drum was popular with a number of users. The following passage regarding the drum magazine appears in the book *Our Kind of War.*

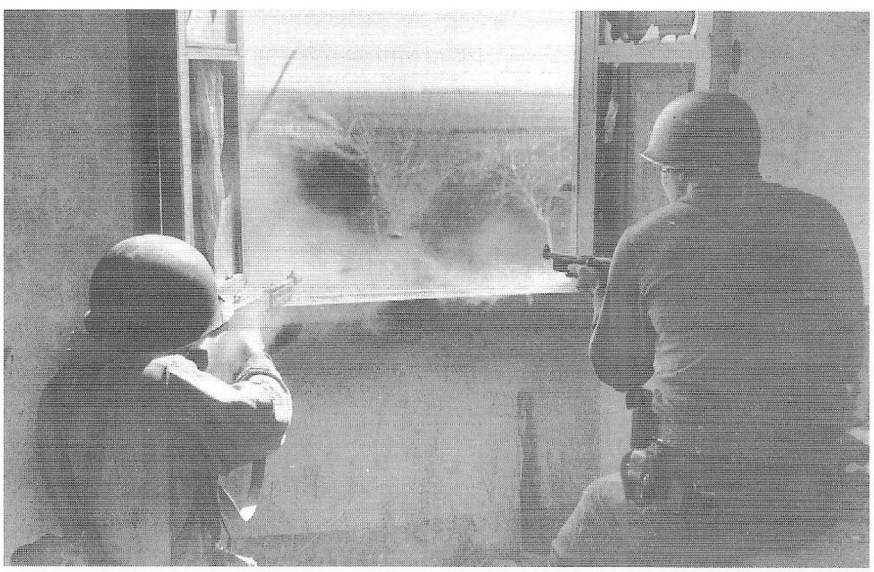
On an amphibious assault, Raiders liked to land with a 50-round drum locked into the weapon. When that was emptied, it was simply discarded and immediately replaced by a 20-round box magazine....

Despite some advantages including an awesome amount of firepower, the 50- round drum magazine had come in for a great deal of criticism. It was considered by many to be awkward, heavy and prone to rattle, all of which were obviously undesirable traits in a combat weapon. The drum magazine was dropped from widespread use fairly early in the war.

In order to compensate for the loss of the drum's firepower, a 30-round magazine, which was essentially a lengthened version of the 20-round magazine, was adopted. This magazine could be used with all models of Thompsons in service including the M1928A1. Some soldiers taped two or three magazines together in a attempt to make reloading faster, but the real value of this can be debated.

Since the Thompson was the only submachine gun in our inventory, it was in the thick of the fighting from the first days of the war. All branches of the armed forces were clamoring for additional Thompsons, and these were provided as fast as production allowed. Officially, both the Army and the Marine Corps wished

M1A1 Thompson with the field-modified metal band on the foregrip. Note that two 30-round magazines have been taped together in an attempt to speed up reloading. (U.S. Army)



Two U.S. soldiers firing Thompson submachine guns during WWII. The gun at left is an M1928A1 and the gun on the right is an M1/M1A1 variant as evidenced by its lack of a Cutts compensator. (U.S. Army)

to substitute the M1 carbine for the submachine gun but the immediate demand for weapons as well as the availability of the Thompson ensured its widespread use. Even when sufficient numbers of carbines were on hand, the wholesale replacement of submachine guns was never accomplished.

As mentioned, the Thompson was a very popular weapon with many combat troops. As Col. John George stated in his book *Shots Fired in Anger,*

...both the old (M1928A1) and new (M1/M1A1) simplified types ...functioned well. It was the perfect weapon for close-defense—carrying one provided perhaps the best life insurance a man could have...

The Thompson's virtues won it many admirers. As stated in *Our Kind of War,*

The Thompson submachine gun was a favorite of the Raiders, as it was rugged and reliable and fired the same readily available ammunition as used in the M1911A1 .45 automatic pistol.

The Thompson's reliability was one of its foremost assets. Unlike some other submachine gun designs that were unreliable when exposed to even moderate amounts of dirt, mud or sand, the Thompson could function surprisingly well even when quite dirty. This is not to say that the Thompson was impervious to dirt, but it was not as sensitive in this regard as were many other contemporary submachine gun designs. At close range, the heavy .45 ACP slug was a sure man-stopper, and the rapid rate of fire, which could make control a bit difficult for a novice shooter, threw out a lot of lead when necessary. The craftsmanship of the weapon, including the simplified M1/M1A1 versions, was first-rate compared to most other submachine guns.

The Thompson was perhaps most popular with specialized troops, such as paratroopers, Army Rangers, Marine Raiders (as mentioned above) and armored infantry troops. Some soldiers considered the possession of a Thompson as something of a status symbol and many soldiers obtained the weapon in any way possible. Even today, many veterans consider the Thompson as one of the best weapons of the war.

Despite the Thompson's overall good reputation and positive attributes, there were a number of problems encountered with the weapon. One of the most frequently voiced complaints was that it weighed more than 10 pounds, even a bit heavier than the M1 Garand. Some of the other deficiencies found in the weapon were, in all fairness, inherent in most submachine guns and were not peculiar to the Thompson. These included the limitations of short range. As Col. George put it, "....the Tommy gun was never good for anything beyond fifty yards or so." Most submachine guns were difficult to control in full automatic fire and the Thompson was no exception. A Marine Corps memo noted that the submachine gun "....when fired full-automatic is very inaccurate in the hands of the average man as well as wasteful of ammunition." This lack of control further limited the weapon's effective range.

A minority of combat troops held very negative opinions about Thompsons. As William Helmer relates in his book *The Gun That Made the Twenties Roar,*

Some American paratroops, as soon as they could get their hands on a German Schmeisser, broke their Thompsons over the nearest rock.....the roadside from Salerno to Naples was littered with Thompsons discarded by soldiers tired of carrying the heavy things.

The most serious drawback of submachine guns, including the Thompson, and the one that caused the most complaints, was the lack of penetrating power. The Marine Corps "Report of Infantry Weapons in Combat," dated October of 1943, alluded to on several previous occasions, revealed the Marine Corps' experience with the Thompson submachine gun in action on New Georgia Island.

Thompson Sub-Machine Gun, Cal. .45; Held up well on all operations with very little maintenance. There were some instances of jamming after a large volume of fire had been delivered. This weapon has become extremely unpopular though, because of its poor penetrating power. The .45 Cal. bullet will not penetrate the branches of trees, roots and dugouts, to anywhere near the degree of the .30 Cal. bullet, and this is vital in jungle warfare. It is suggested that this weapon in the squads be replaced with a .30 Cal. automatic weapon.

As stated previously, the carbine was intended to replace the submachine gun in the service, but this goal was never achieved. The carbine's greater range and penetrating power were frequently cited as improvements over the .45 caliber submachine gun. In theory, this was true. However, in close-quarter combat situations, where penetrating power and long-range performance were not factors, the submachine gun was superior. Many veterans would not have traded their Thompsons for any other weapon in Uncle Sam's inventory. Even with the weapon's limited range, relative inaccuracy and heavy weight, its attributes out-weighed its deficiencies in the eyes of many combat soldiers.

The Thompson saw wide use in all theaters of the war and remained in service throughout World War II. Although officially replaced after the war by the M3A1 submachine gun, a few Thompsons remained in use during the Korean War. The weapon also saw a surprising amount of service in Vietnam. Most of the Thompsons used during this period by American troops were procured from stocks of the weapons provided to the South Vietnamese government through military aid programs.

The Thompson submachine gun is still remembered today by many veterans as a reliable weapon that could be counted on when the chips were down.

The M2, M3 & M3A1

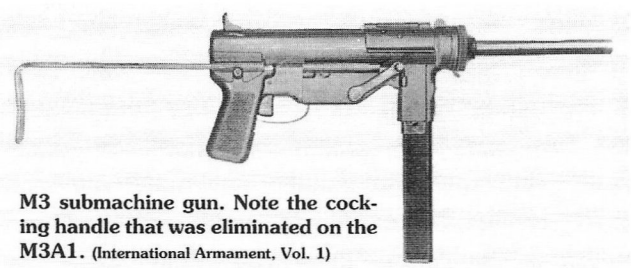
As we have discussed, the widespread use of the Thompson was due mainly to the fact that it was the only allied submachine gun in mass production at the beginning of World War II. In February of 1941, even while plans were being made to greatly increase Thompson production, the Ordnance Department began a search for a new submachine gun. Twenty foreign and domestic submachine gun designs were tested at the Aberdeen Proving Ground. Somewhat surprisingly, the highest rated foreign submachine gun was the very crudely-made Sten, which had just been adopted by the British. The Sten, which was of stamped and welded metal construction and finished with a paint-like coating, was about as different from the finely crafted Thompson as could be imagined. Nevertheless, the Sten scored higher than the Thompson when such things as simplicity, accuracy, weight and reliability were measured. The Sten also had the

very big advantage of being much cheaper and faster to produce than the Thompson.

Prototype M2 submachine gun (World's Submachine Guns, Vol. 1)

M2 Submachine Gun

The highest rated domestic design was a submachine gun designed by George J. Hyde. The Hyde gun was not as simple to produce as the Sten but required markedly less production time and cost than the Thompson. Since the Hyde gun showed some promise, the Ordnance Department negotiated a contract with General Motor's Inland Manufacturing Division (which was just becoming involved with M1 carbine production) to work with Hyde in refining the design. Several refined prototypes were manufactured and the design was hurriedly adopted in April of 1942 as the "U.S. Submachine Gun, Caliber .45, M2" and given the designation of Substitute Standard. Since Inland was, by this time, very heavily involved in production of the M1 carbine, the firm could not take on the task of manufacturing the M2 submachine gun. In July of 1942, the Marlin Firearms Company accepted a contract to produce the M2 on an expedited basis. However, due to a combination of problems including difficulties in acquiring the necessary raw materials and some inherent design bugs, the M2 submachine gun never made it into production and the project was soon scrapped. In order to fill the demand for submachine guns, additional Thompsons were procured from Auto-Ordnance and Savage.



M3 submachine gun. Note the cocking handle that was eliminated on the M3A1. (International Armament, Vol. 1)

M3 and M3A1 Submachine Guns

When it became apparent that the M2 wasn't going to work out, the Ordnance Department began to search for another submachine gun design. After taking a second long look at the British Sten, the Technical Division of the Ordnance Department officially announced a program in October of 1942 to procure "...an all-metal gun, fabricated as far as possible from stamped parts to permit speed and economy of production and to require a minimum of machine operations and use little or no critical metals... A full automatic weapon with a low cyclic rate..."

With the M2 concept abandoned, George Hyde submitted a totally different design that met all of the above parameters. Hyde's new gun was lighter and more compact than the Thompson and was constructed chiefly of stamped metal, thus overcoming the raw materials problem encountered with the ill-fated M2. The new gun could be made for less than $20, a fraction of the cost of even the simplified M1/M1A1 Thompsons, and it required significantly less manufacturing time. Hyde's new gun was more reliable than the Sten. Since it was an unusual and crude appearing weapon compared to the Thompson, the gun offended the sensibilities of some traditional-minded military people. With this in mind, the Ordnance Department stated the obvious in the summation of the gun's test report; "....in modern warfare there are other criteria than mere appearance."

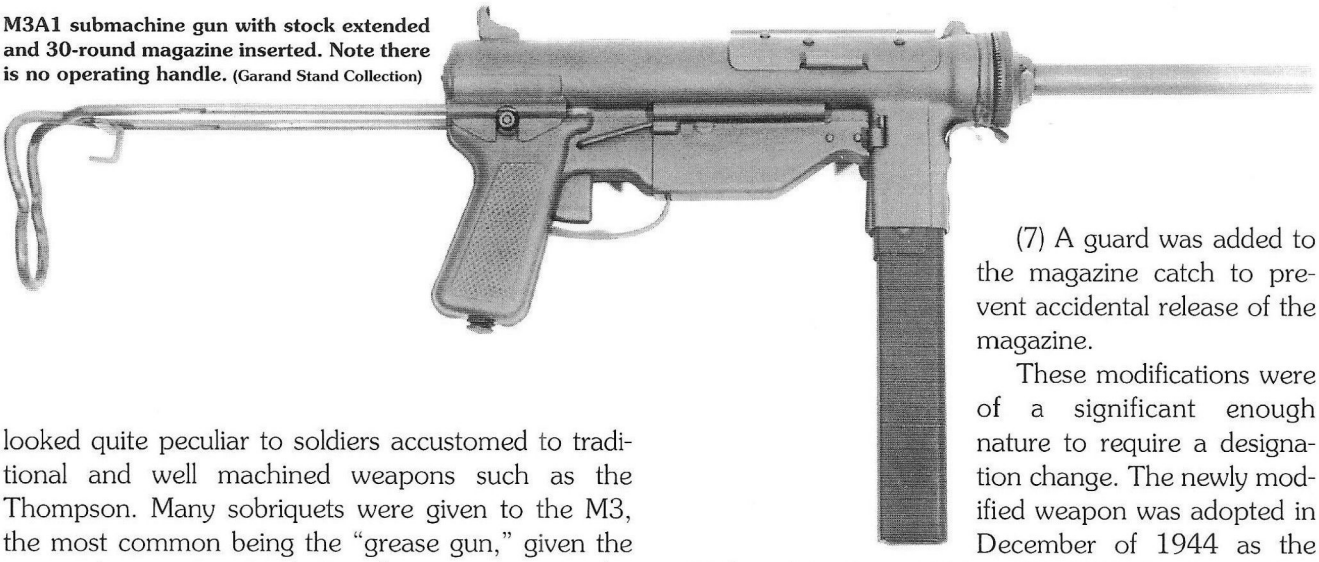
The new submachine gun was formally adopted on December 24, 1942, as the "Submachine Gun, Caliber .45, M3" only some two months from the time the initial design was submitted.

General Motor's Guide Lamp Division, which had extensive experience in metal stamping fabrication, was selected to manufacture the new submachine gun and production was underway by the summer of 1943.

The .45 caliber M3 had a number of excellent design features in addition to its ease of manufacture. The low cyclical rate of fire, approximately 400 rounds per minute, made the gun easier to control than most other submachine guns, including the Thompson. The weapon's straight line of recoil thrust also aided substantially in controlling the gun in automatic fire. An ejection port cover helped keep out a great deal of dirt and mud, and the gun's general loose tolerances allowed for operation even if it became very dirty. The bolt was designed to travel along two steel guide rods which added to the gun's reliability and smooth operation. The M3 was more reliable than the Thompson under adverse conditions.

The new submachine gun was issued with a 30 round box magazine. The M3 was only capable of fully automatic operation; however, with its slow rate of fire, an experienced shooter could squeeze off single rounds without much trouble.

When the M3 began to be issued in the latter part of 1943, its reception was not enthusiastic. The gun



M3A1 submachine gun with stock extended and 30-round magazine inserted. Note there is no operating handle. (Garand Stand Collection)

looked quite peculiar to soldiers accustomed to traditional and well machined weapons such as the Thompson. Many sobriquets were given to the M3, the most common being the "grease gun," given the weapon's uncanny similarity of appearance to the automotive mechanic's lubricating tool of the day. The M3 soon became widely known as the grease gun, a nickname that prevails to this day. The M3 was made in fairly sizeable quantities with total production during World War II of 605,664 guns. All were made by Guide Lamp.

Even with the M3's good traits, a number of problems became apparent as the gun was phased into service. The M3 had rather poor balance, which could make its use a bit awkward to an inexperienced shooter. The magazine proved to be somewhat temperamental and was not as reliable as the Thompson's magazine. In February of 1944, changes were made in the design of the gun that were incorporated into production models. These included a reinforced rear sight, a strengthened magazine catch, a higher grade of metal for the cocking lever and a redesigned bolt retracting lever.

While these changes helped somewhat, a program was initiated in April of 1944 to come up with additional modifications aimed at further increasing the weapon's utility and ease of manufacture. The following changes were made in the basic M3 design.

(1) The ejection port was enlarged.

(2) Since the original M3's retracting handle had proved to be rather troublesome, it was eliminated and a finger hole added to the bolt which enabled it to be pulled back to cocked position.

(3) Disassembly grooves were added to the barrel to assist in removal.

(4) The cover spring was made stronger.

(5) The wire buttstock was redesigned to allow it to be used as a barrel removal wrench and as a magazine filler.

(6) The grip contained an oil can with a greater capacity.

(7) A guard was added to the magazine catch to prevent accidental release of the magazine.

These modifications were of a significant enough nature to require a designation change. The newly modified weapon was adopted in December of 1944 as the "Submachine Gun, Caliber .45, M3A1" and was classified as Standard. The M3 was reclassified as Limited Standard. In April of 1945, the M3 and new M3A1 guns were slated to replace all submachine guns in service and the Thompsons were to be turned in. However, the war ended before this could be accomplished. Relatively few M3A1s were produced with only some 15,469 made before the end of the war. Not many M3A1s made it overseas before the cessation of hostilities, and the M3 was the only variant of the grease gun to see any appreciable amount of combat use during World War II.

Among the first troops issued grease guns were specialized troops, such as the Rangers and paratroopers, as well as tank crewmen and armored infantry personnel. The M3/M3A1 submachine guns, with their telescoping wire stocks, were very compact weapons ideal for being either inside the cramped confines of a tank or packed away for a parachute jump. The M3's first significant baptism of fire was in the hands of the 82nd and 101st Airborne when they jumped into France prior to the Normandy invasion. However, the M3 was relatively uncommon at this time in the war, and the Thompson was still the most widely used submachine gun in the hands of the "All Americans" and the "Screaming Eagles" when they jumped into France to begin D-Day.

As the war progressed, increasing numbers of M3 submachine guns were issued to the infantry. The reception given the homely grease gun was, at first, uniformly negative. While the weapon was reliable and had some good design features, the majority of troops who were issued grease guns would have preferred Thompsons. As one writer has aptly noted, "If the Thompson was a Cadillac, the grease gun was a jeep." As some troops gained combat experience with the M3, however, its negative perception began to be tem-

(left) M3 submachine gun with three 30-round magazines taped together to permit faster reloading. While this practice was popular with some soldiers, its actual value is questionable.
(The World's Submachine Guns)

(bottom, left) Photograph taken November, 1944, near Nancy, France showing an assistant driver of an M4 Sherman tank armed with a .45 cal. M3 submachine gun. The M3's cocking handle is clearly shown in this view. The weapon's compact size made it a handy weapon for tank crewmen. (U.S. Army)

(bottom, right) American soldiers, ETO, winter of 1944-45. The officer at right is carrying an M3 submachine gun.
(U.S. Army)

pered somewhat when it was discovered that the ugly weapon was at least as reliable (if not more so) as the Thompson and had the advantage of being lighter and more accurate in fully automatic fire. The M3 proved to be a valuable weapon for patrolling and other related uses.

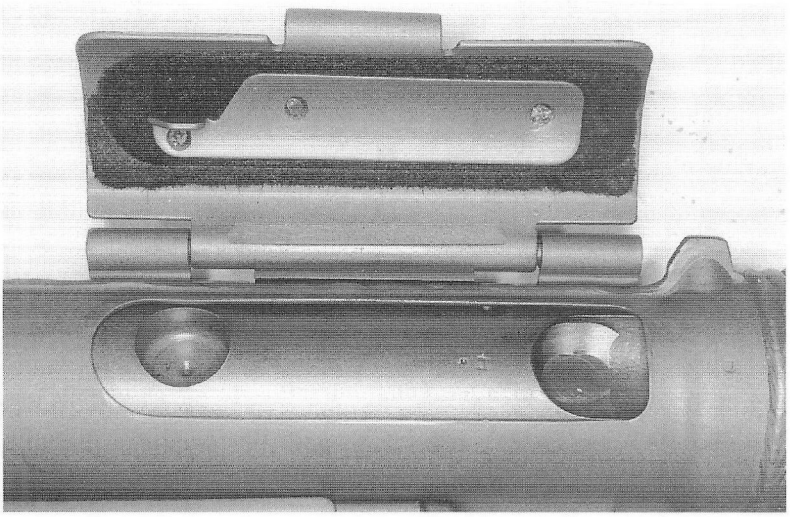
The Marine Corps began to evaluate the M3 submachine gun immediately after its adoption by the Army. A Marine Corps memorandum dated January 26, 1943, stated that

The Army has recently standardized the submachine gun M3 which has relegated all other Army submachine guns to the "Substitute Standard" class. It is understood that, as soon as the M3 is in production in sufficient quantities, the production of other types will be discontinued. The gun is made almost entirely of stampings and is consequently both cheap and easy to manufacture. Tests indicate that it is equal or superior to all other .45 caliber guns, especially in performance under adverse conditions such as rain, dust, mud, etc. and that it will remain in an operating condition with a minimum of care. It is believed that Marine Corps requirements for this gun should be determined now.

The Marine Corps eventually adopted the M3 as well and the weapon was issued to Marines in the latter stages of World War II. As with the Army troops, despite the gun's virtues, the Marines were initially not overly impressed with the grease gun. William Helmer wrote that "....when the new M3 arrived many Marines would not turn in their battered but faithful Thompsons." Again, some Marines eventually recognized the value of the M3 and grudgingly accepted it as a reliable and useful weapon.

As World War II came to a close, the grease gun was being issued in ever-growing numbers and the Thompson was rapidly being replaced. The technology of the M3/M3A1 was a portent of things to come in the future for military weaponry. The old days of designing and building a weapon to last for one or more lifetimes was rapidly drawing to a close. The craftsmanship involved in producing weapons having fine-

M3A1 submachine gun with stock retracted. The weapon's compact size makes it ideal for use inside tanks and it remains an issue item even today.
(Garand Stand Collection)



M3A1 ejection port with cover open and bolt in closed position. The large hole in front of the bolt allowed it to be retracted by inserting a finger and pulling it to the rear. **(Garand Stand Collection)**

M3A1 submachine gun magazine release. The "Guide Lamp" trademark, ordnance escutcheon and serial number are visible in this view.
(Garand Stand Collection)

ly milled metal components and attractive wood stocks proved to be a costly and time-consuming extravagance in wartime. The M3's ability to be made cheaply and quickly and still function reliably were assets too great to overlook. Soldiers accustomed to the conventional, well-made Thompson were understandably reluctant to accept the crude appearing grease gun with its stamped metal parts welded together. However, the grease gun's looks belied its endurance and reliability. While the M3/M3A1 did not play an extremely large role in the Second World War, the weapon did validate the concept of function over beauty. While a number of soldiers may have mourned the passing of their Thompsons, the grease gun's ability to take a lot of abuse and still come up shooting more than made up for its aesthetic shortcomings.

With the end of World War II, the bulk of Thompsons in inventory were withdrawn from service, and the M3A1 became the standard post-war American submachine gun. It still remains in limited use by our armed forces today—not a bad record for a gun that hasn't been manufactured for over 40 years.

Model 50 & Model 55 Reising Submachine Guns

In addition to the Thompson and the grease gun, the United States armed forces fielded one other submachine gun during World War II, the Reising.

The gun was designed by Eugene G. Reising, a graduate of Lehigh University and a gun designer of some note. He had previously been on John Browning's team during the development of the M1911 .45 automatic pistol and later worked for a number of commercial firms including Savage, Stevens, Mossberg and Marlin.

With the outbreak of World War II in Europe, Reising realized that a new submachine gun might be a lucrative venture. He had been working on the development of a submachine gun for some time and a patent for the design was applied for on June 28, 1940.

Eugene Reising negotiated with the firm of Harrington & Richardson (H&R) to manufacture his submachine gun and production commenced in December of 1941. The timing was obviously fortuitous for Reising and H&R as the United States entered World War II at precisely the same time.

Reising's submachine gun had several unusual features including the fact that it was a delayed blowback weapon that fired from a closed bolt. The bolt locked into position by rising slightly into a recess machined into the top of the receiver. Most submachine guns utilized the conventional blowback method of operation (the so-called "slam fire") and fired from an open bolt that allowed for simple operation and better cooling of the chamber in automatic fire. The major disadvantage of the blowback mode of operation was the fact that the heavy bolt slammed forward almost simultaneous to the moment of firing, thus disturbing the aim. On the typical semiautomatic design, the bolt came forward, was locked into battery and then the weapon was fired. This permitted greater accuracy than was possible with a fully automatic blowback mechanism. Reising's submachine gun fired from a closed bolt mode rather than the blowback method as was utilized on virtually all other submachine guns. This feature made the Reising one of the most inherently accurate submachine guns and the designer believed that the trade-off between improved accuracy and more efficient cooling was worthwhile.

The weapon was cocked by means of an action bar located in a recess on the underside of the forearm. This location had the advantage of protecting the bar from damage and inadvertent manipulation, but the recess could become clogged with dirt or mud.

When the U.S. Army's Ordnance Department tested the Reising submachine gun, it was noted that the weapon's operation was actually a rapid series of semiautomatic shots. However, the gun fired at the rate of approximately 450 rounds per minute, which was almost as fast as the military versions of the Thompson and somewhat faster than the later M3 submachine gun. The Army's testing of the Reising was conducted at the Aberdeen Proving Grounds and met with mixed results. An endurance test in which 3,470 rounds were fired resulted in only two malfunctions, one that was traceable to a defective cartridge. However, other tests revealed some functioning problems when the weapon was not cleaned regularly and subjected to operation in dirty conditions. The Army declined to adopt the Reising and remained firmly committed to the Thompson while embarking on a program to develop a better replacement.

Like the Army, the Marine Corps' official submachine gun was the M1928A1 Thompson but there were not nearly enough on hand and production was insufficient to meet the demand. The Thompsons

(top) Military issue M50 H&R Reising submachine gun. The Reising was widely used by the Marines early in WWII but was plagued by reliability problems. (center, left) Markings on Reising submachine gun. Note the "P" proof marking on the rear portion of the barrel. (center, right) Reising submachine gun fire selector lever. Note the simple adjustable rear sight. (bottom, left) M50 Reising compensator. This compensator was similar in function to the Thompson's Cutts compensator but differed in design and configuration. (bottom, right) Underside of Reising submachine gun. Note the operating lever located in the recess behind the sling swivel. The magazine catch can be seen between the magazine well and the take-down knob.

coming off the Savage and Auto-Ordnance assembly lines were earmarked for the U.S. Army and for Lend-Lease commitments. Therefore, the Marine Corps needed another source of submachine guns. Since H&R had just gotten underway with Reising production and needed customers, it was only natural that the Marines took a serious look at the new gun.

The results of the official Marine Corps testing of the Reising submachine gun prior to adoption have not been found. However, it is apparent that the weapon's most valuable asset to the Marines was the fact that it was available. As the Army's tests had shown, under ideal conditions, the Reising could perform as well, or better, than just about any other submachine gun around. Its closed bolt mode of operation made it accurate, particularly in semiautomatic fire, and at 6.75 pounds (unloaded) it was much lighter than the Thompson. The barreled action could be quickly removed from the stock by means of a knurled thumb screw.

Model 50

The Marine Corps adopted the Reising submachine gun in early 1942 as the Model 50. It was intended as a supplementary weapon until Thompsons became available in sufficient quantities.

U.S. Marine "Navajo Code Talkers" at work on Bougainville. The Navajo language was impossible for the Japanese to decipher and provided a secure means for communication. The Marine on the right has a Model 55 Reising submachine gun ready for instant use. The weapon has the limited capacity 12-round magazine in place. (National Archives)

Reising Model 55 submachine gun.
(Hayes Otoupalik Collection)

The M50 was chambered for the standard .45 ACP cartridge and was 35.75 inches long. It had a wooden stock with sling swivels and a metal buttplate. The rear sight was made of stamped sheet metal and was adjustable for elevation from 50 to 300 yards. A lever on the right side of the receiver allowed for selection of semiautomatic or fully automatic fire and also served as a safety lock. The Reising had a compensator on the end of the 11" barrel which functioned in much the same manner as the Thompson's Cutts compensator but was somewhat different in general configuration. The M50's barrel had cooling fins located near the receiver.

Model 55

Soon after the adoption of the Model 50, the Marine Corps requested a modified version of the gun for use by the new "Para Marine" airborne units being formed. H&R submitted a Reising submachine gun having a short wooden stock with a pistol grip and a folding wire buttstock. In order to further shorten the weapon, the compensator was eliminated. Otherwise, the modified gun was the same as the Model 50. This weapon was soon adopted by the Marine Corps as the Model 55. The Model 55 was 31.25" in length with the stock extended and just 22.25" with it in folded position. The gun's unloaded weight was 6.25 pounds. The 1942 H&R manual on the Reising contains this slightly glowing passage about the Model 55.

...the H&R Reising was the first submachine gun so designed as to permit arming of the parachute trooper during descent. Again first, the United States Marine Corps Parachute Troopers have shown the way to land their fighting men, each completely and powerfully armed, ready to fight the instant they are on the ground, daylight or dark, and independent of the vagaries of cargo chutes, all too often lost in the woods and brush or in the dark lights of an early dawn. Tank crews find the H&R Reising Model 55 ideally suited to their needs, because of its compactness which permits it to be racked up out of the way yet near at hand when needed. The Model 55 may be used through the pistol port of a combat vehicle with the facility of a pistol.

The U.S. Army briefly considered standardizing the Reising M55 for tank crews due to its compact size. However, reliability problems and the development of the M3 submachine gun resulted in the Army dropping consideration of the M55 Reising.

Harrington & Richardson also manufactured a version of Reising's gun, the Model 60, for sale in the commercial market. This gun was capable of semiautomatic fire only and had a longer barrel (18.25") to remove it from the restrictions imposed on fully automatic and/or short barrel (under 16") weapons. It used the same type of magazines as did the military issue M50 and M55 submachine guns. The M60 was intended for use by civilian guards and security personnel. However, there is some sketchy anecdotal evidence that a few M60 Reisings may have been used by some Marine Raiders during the war. If so, such combat use of the M60 would have been very limited.

The following is a Navy Department press release dated August 22, 1942, about the Marine Corps' adoption of the Reising.

Marines Adopt New Weapon

The Reising Submachine Gun has been officially adopted as a supplementary .45 caliber weapon by the Marine Corps.

In recent months several thousand of these deadly, close-range guns have been procured and issued to Marine parachute troops and other special assault units.

(left) August, 1943 photo depicting three Marine Raiders in the Solomon Islands. The Raider at left is holding a .45 caliber Reising submachine gun with a 12-round magazine. Note the lack of a compensator on the muzzle. This indicates that the weapon is either an M50 Reising that has had the compensator removed or an M55 Reising action that has been placed in an M55 stock. Close examination will reveal an M55 Reising, with stock folded over the left shoulder of the Marine at the right. (National Archives)

(right) "ParaMarine" with his M55 Reising submachine gun (magazine removed) after a training jump, San Diego, 1943. (National Archives)

Two models of the Reising gun are used by Marines. One has the conventional solid stock, and closely resembles an ordinary rifle in appearance. The other has a folding steel-frame stock and pistol grip, giving the weapon unusual compactness and a weight of only 6½ pounds.

The latter model, designed for use by parachute troops, was developed by the inventor and manufacturer at the suggestion of Marine Corps weapons experts. Its size enables parachutists to jump while carrying weapons of high fire power.

The Reising is effective at ranges up to 300 yards, and is suitable for use by mechanized troops, air-borne infantry, vehicle operators and others whose duties require a short and light, yet high-powered and accurate weapon.

The Reising Submachine Gun uses standard .45 calibre ammunition. With full automatic adjustment, it fires at the rare of 400-450 rounds per minute. It is also capable of semi-automatic operation - one shot at a time, with automatic reload. Leaving the muzzle at a rate of over 300 yards per second, the snub-nosed .45 bullet will penetrate six inches of white pine at 20 yards.

The gun is of simple construction, having only three moving parts. Loaded magazines may be inserted swiftly and the weapon does not "buck" as much as similar guns when long bursts are fired. It is air-cooled and reloading is accomplished by a delayed blow-back.

The above press release certainly portrayed the Reising submachine gun in a very favorable light. Of course, that is the purpose of most press releases!

While appearing on the surface to be a simple

design, the Reising was actually a fairly complex weapon. It was capable of functioning in a satisfactory manner when clean. However, the fact that the tolerances between the gun's bolt and its locking recess were so tight meant that even a small amount of dirt could cause problems. Some writers have stated that the subsequent problems encountered with the Reising were due to the fact that the gun was cheaply made. Even though much of the weapon was made by H&R on 50-year-old machines, this was not the case. The Reising was actually a relatively well made weapon, particularly compared to most submachine guns (the Thompson notwithstanding). Its receiver was machined from a solid steel bar and the barrel was made of the finest nickel chrome steel. While the design may have been flawed from a military standpoint, as far as its construction was concerned, the weapon was not the "hunk of junk" as had been alleged.

USMC "ParaMarine" ready to jump with his H&R Reising submachine gun. The weapon pictured is unusual as it is equipped with the M55 folding stock but has a compensator on the end of the barrel as found on the M50. It is likely that, in this instance, an M50 barreled action was installed in an M55 stock. (Imperial War Museum)

The Reising submachine gun's magazine was also a bit unusual. It utilized a staggered column design with single cartridge feeding. This combined the worst of both worlds in magazine design. The smallest amount of damage to the magazine's feed lips would render the gun inoperable. The standard Reising magazine had a 20-round capacity. In addition to the 20-round magazine, a 12-round magazine was also produced. The purpose of this magazine has been the subject of some speculation; it obviously was not nearly as desirable as the larger capacity 20-round type. Some writers have stated that it was intended for either training or guard use, which seems logical. However, a number of World War II Marine Corps photos clearly show the 12-round Reising magazine used in combat. The real reason(s) behind the 12-round magazine are unclear, but the magazines were made in relatively large numbers. They certainly weren't any handier than the 20-round type as they were the same length, but they had the capacity reduced by means of two deep creases on either side of the magazine. Since the 12-round magazine held the cartridges in a straight line position rather than staggered as in the 20-round variety, it is reasonable to suggest that the lower capacity magazine was developed to help alleviate reliability problems. Both types of magazines were made by Harrington & Richardson and so marked on the front edge. Since the feed lips on the Reising's magazine were the most critical area, it was not uncommon for Reising users to carefully sort through a number of magazines to find specimens with undamaged feed lips.

The M50 and M55 Reising submachine guns saw action early in the Pacific war. Many came ashore on Guadalcanal in the hands of the Marines and the problems soon began. While the weapons may have functioned fine in training camps when they were carefully treated and cleaned frequently, the rigors of combat quickly revealed the unreliability of the Reising. Since it was impossible to keep weapons absolutely free from dirt, sand and mud in combat, the Reising malfunctioned with alarming frequency. Combat soldiers may complain about the weight of a weapon or other features, but the fact that a gun was not reliable constituted an unpardonable sin. Many stories have been told regarding the Reising's faults and the distrust in which they were held by many Marines. One typical reaction is related in the book *Semper Fi Mac.*

While we were at it, I figured it was a good time for me to toss my ridiculous Reising submachine

gun. What a lemon—a real .45 caliber hunk of junk. I think before long every officer who had one had dumped it. I wonder who hung that beauty on Uncle Sam. Later on I got hold of a Thompson, a real *submachine gun.*

Along the same lines, Marine Major Frank Hough wrote the following in his book *The Island War.*

Only one weapon had proved to be a definite failure: the Reising submachine gun. The Marine Corps had adopted this in the beginning largely as a measure of desperation, because of their inability to obtain the Thompson, or "Tommy Gun", in sufficient quantities. It could be produced quickly and cheaply, and it worked well enough on the proving grounds. But it simply would not stand up under combat conditions. On Guadalcanal, where men's lives depended on their weapons, Marines began throwing their Reisings into the Lunga River and falling back on their rifles.

Reising submachine guns being inspected and test fired at the H&R factory. (Harrington & Richardson Arms Co.)

The abandonment of Reisings on Guadalcanal was not an isolated occurrence. It has been recorded that Lt. Col. Merritt A. Edson actually ordered a large number of Reisings to be dumped into the Lunga River in order to prevent them from being issued to his troops. Clearly, when a commanding officer orders his troops to throw away a particular type of weapon, there was a serious problem.

Not all combat-wise soldiers felt that the Reising was totally useless. Lt. Col. John George, in his book *Shots Fired in Anger,* says that "They (Reisings) did possess a tremendous advantage in their very light weight and this would have caused me to carry one as a personal weapon had I been forced to choose between a Reising and a Tommy, although I had more confidence in the latter."

It should also not be inferred that the Reising never worked in combat. Obviously there were problems encountered with the weapon, but it still provided valuable service on some occasions. In the book *A Special Valor,* a Marine Raider Lieutenant relates the following incident.

...The Japs..broke from the jungle almost on top of us, charging in solid waves. I screamed the alarm as I began firing my Reising submachine gun....the rest of the men were falling back as I emptied two magazines...

Apparently, this was one Marine who benefitted by having a Reising submachine gun rather than an

M55 Reising shown on the rarely seen camouflaged canvas jump case. (Hayes Otoupalik Collection)

'03 rifle.

The Model 55 had an even worse reputation than the Model 50. Its flimsy metal stock was totally inadequate and the lack of a compensator did not help either. A Marine Corps document stated that "...sufficient additional Reising submachine guns, Model 50 only (straight stock), be procured to meet the requirements of posts and stations in the United States and that no more Model 55's (folding stock) be procured."

The precise number of Reisings produced during World War II is not known, although several sources give a figure of approximately 100,000. This is probably fairly close but undoubtedly includes guns made for the commercial market as well as guns supplied to allied nations (especially the Soviet Union) under Lend-Lease. A Marine Corps document dated January 26, 1943, stated that

Approximately 52,000 Reising submachine guns have been received to date of a contract for 65,000. M1 submachine guns (new Thompson) are expected at the rate of about 600 per month.

As can be seen, it is doubtful if any more than the original contract number of 65,000 guns were procured by the Marine Corps. It is entirely possible that the contract was cancelled prior to its completion if enough Thompsons or carbines became available. Therefore, it can be determined that somewhere between 52,000 and 65,000 Reisings were delivered to the U.S. Marine Corps during World War II. This figure likely includes both the M50 and M55 variants. Except for the Lend-Lease guns, the remaining 100,000 Reisings were utilized for such commercial duties as prison and plant guarding and police work. Even though more of the military guns were made, smaller numbers have survived due to their use in combat (including being dumped into the Lunga River). The differences between the military Reisings and the civilian guns are detailed in the Collector Notes section of this book.

The last of the Reisings were delivered to the Marine Corps in early 1943. As Thompsons and carbines became available, the Reisings were withdrawn from front line combat service. The Marine Corps Tables of Organization & Equipment authorized 4,206 Reising submachine guns for each division in 1942, but by the end of 1943, the weapon was no longer listed. By late 1943, practically all of the Reisings were out of the hands of front line combat troops. Although no Reisings were acquired by the Marines after 1943, the weapon remained in production by Harrington & Richardson until 1945. These later production Reisings were made for the commercial market but civilian sales were limited. After serving stateside as guard and security weapons, the government-owned Reisings were declared surplus and many were either destroyed or given to police departments during and after World War II. H&R made some attempts to market the Reising submachine gun for post-war police use. The firm noted that the folding stock M55 would be an ideal weapon for use in a patrol car. However, most law enforcement agencies had access to surplus submachine guns at little or no cost, so H&R did not sell many Reisings after the war. The company dropped the gun from its line shortly after the end of World War II.

Few American military weapons of World War II have such a negative image as the Reising. While a fine gun for civilian police or security use, its reliability problems forever damned it in the eyes of the Marines who used it in World War II. Despite its failures, the Reising is still an interesting and historical weapon due to its use in the early stages of the Pacific war.

"M42" UD (United Defense) Submachine Gun

There was one other submachine gun manufactured in the United States during World War II. None were issued to the American Armed Forces during the war, but the weapon was supplied to several allied countries during the war. It was also an item of issue to the OSS for use in various clandestine-related operations. The M42 was invented by Carl Swebilius, who was affiliated with the firm of High Standard. High Standard developed the prototype and produced a few early versions of the weapon, but the Marlin Firearms Company manufactured approximately 15,000 of these guns.

Prototype of "UD Model 1942". (World's Submachine Guns, Vol.1)

Most of these guns were chambered for the 9mm cartridge but a few .45 ACP versions were made as

Wounded French soldier (possibly a member of an OSS sponsored outfit) with American troops. Note his "UD 42" 9mm submachine gun with the side by side magazines.
(Konrad F. Schreier, Jr.)

well. The M42 could accept a conventional box magazine and also had the ability to be used with staggered side-by-side magazines.

Government records indicate that 2,405 9mm Marlin MD 42 submachine guns were air-dropped in France from January to October of 1944 for use by OSS-related resistance operations.

The MD42 was an unremarkable submachine gun with no outstanding virtues or glaring vices. Since it was not an issue item to U.S. armed forces, it is a little known weapon today and extremely few surviving examples are around.

Collector Notes

THE THOMPSON SUBMACHINE GUN

The Thompson submachine gun has long been one of the most popular weapons of its type with collectors. Since the Thompson is capable of fully automatic operation, its ownership and possession are subject to the regulation of the National Firearms Act of 1934. The gun must be properly registered with the Department of the Treasury's Bureau of Alcohol, Tobacco and Firearms. The procedure involved in registering a machine gun is covered in Table #42 of this book. This section also covers the Deactivated War Trophy (DEWAT) guns which were deactivated to prevent firing. The DEWAT program has been discontinued by the government, but many of the guns registered under the program are around.

Model 1928 and 1928A1

The Colt-made Model 1928 U.S. Navy is the earliest military issue Thompson except for the handful of M1921 guns acquired by the Marines prior to the official adoption of the weapon. These early M1921 Thompsons are not believed to have been marked to denote government ownership. The U.S. Navy Model 1928 Thompson, on the other hand, is easy to identify. The left side of the receiver is marked "U.S. Navy" over "Model of 1928". As stated, these guns were originally Model 1921 Thompsons and the "1" was over-stamped with an "8". These guns are typically called "Navy over-stamps" by collectors. It should be noted that a number of commercial Thompsons were marked exactly like the "over-stamps" including the "U.S. Navy" marking, so one must not assume that all such guns were government issue.

Many of the Navy Thompsons that remained in service at the time of the standardization of the Model 1928A1 were refurbished at various arsenal depots. The alterations to these guns included the stamping of "U.S." next to "Model" on the receiver and stamping "A1" after the "1928" marking. Some also had their original blued finishes replaced by parkerizing. Examples have been noted stamped "RIA" or "SA", which would indicate that these guns were rebuilt at either Rock Island Arsenal or Springfield Armory. Since relatively few U.S. Navy Thompsons were acquired and fewer still survived the war, such modified guns are rarely encountered today and are a scare and desirable variant.

The standard government contract M1928A1 military issue Thompsons can still be purchased today but as with all Thompsons, prices have risen dramatically over the past 20 years. Generally speaking, many collectors prefer the earlier military issue Thompsons with the Lyman rear sight and finned barrel and prices for this variant are generally a bit higher than the later issue guns with the stamped sight and/or the smooth barrel. However, the difference in price or desirability is not really significant and all of these guns in collectible condition are desirable, if expensive, items. There is little, if any, difference in value between the Savage and Auto-Ordnance-made Thompsons.

While identification of a military issue M1928A1 Thompson is not difficult, there are many minor differences found in these guns. The left side of the receiver is marked "U.S. Model of 1928A1". However, very early versions of the weapon made by Savage are marked "Model of 1928" even though they were procured under government contract as Model 1928A1s. Savage produced a few guns for the commercial markets marked in this manner and carried over this marking format on its early military guns. As stated, most of these early guns also had the spelling "Calibre" rather than "Caliber" marked on the receiver.

The manufacturer of the M1928A1 Thompson can be identified by the prefix of the serial number. The Savage made guns had an "S" prefix and the Auto-Ordnance made guns had serial numbers prefixed with "AO". In addition, most of the component parts were marked with an "S" or "AOC" (Auto-Ordnance Corporation). The majority of the govern-

ment contract M1928A1 guns were stamped on the left side of the receiver with "GEG" (the initials of Auto-Ordnance's chief inspector, George E. Goll).

As originally manufactured, the M1928A1 Thompsons were serially numbered on the left side of the receiver and on the bottom of the trigger guard. However, as the guns were disassembled for cleaning and maintenance, the trigger guards and receivers were often swapped. Many, if not most, military issue Thompsons will be found with mismatched numbers today. While a Thompson with matching numbers is more desirable than a mismatch, the value is not affected as much as might be thought since the situation is fairly common. Mismatched commercial Thompsons are generally devalued more than are the military issue guns. In addition to the matching numbers on the trigger guard and receiver, a collector wishing to acquire a totally factory original Thompson must be certain that the component parts are marked with the correct manufacturer's code. For example, an "S" marked finned barrel would not be properly found on an unaltered "as issued" Auto-Ordnance manufactured Thompson.

As with the earlier variants, the M1928A1 Thompsons were marked on the right side of the receiver with various patent dates. Early production M1928A1 guns were marked "New York, NY, U.S.A." while the later production guns were marked "Bridgeport, Connecticut, U.S.A.". All were marked "Auto-Ordnance Corporation", regardless of the manufacturer. There were numerous marking variants found on the military contract M1928A1 Thompsons. For example, about one-fifth of all military contract M1928A1 Thompsons were marked "Tommygun" on top of the receiver between the actuator slot and the rear sight. It has been reported that this marking was included on a certain number of guns in order to protect the copyright previously granted for the name "Tommygun". On guns not marked in this manner, the typical bullet-shaped logo with either "Thompson" or "Auto-Ordnance" marked inside will be seen.

All of the M1928A1 Thompsons had parkerized finishes and all were fitted with Cutts compensators. The bolt and many of the internal parts were nickeled to provide for smooth operation. The military issue M1928A1 had what is called the Third Model compensator, which differed from the earlier compensators used on the Colt-made guns in that it had the Thompson logo stamped on the left side. The majority of the military issue compensators were blued, although some parkerized examples have been seen.

The wooden horizontal foregrip and the removable buttstock on the government contracts guns were of slightly lower quality wood than found on the Colt-made guns. The later production buttstocks are easy to spot because they have the somewhat unsightly large reinforcing bolt to help strengthen the wood. Some Thompsons (of all variants) may be seen with a metal band around the foregrip. This was an ordnance field modification to reinforce the grip in this area and was not a factory feature. A Thompson having this band can be assumed to have been issued to troops in the field.

As with all other types of U.S. military small arms, large numbers of Thompsons were rebuilt by various ordnance facilities during and after World War II, where the weapons were cleaned and repaired by replacing worn and broken parts. Many were reparkerized. The initials of the rebuilding facility were stamped on the weapon. Beginning in the early 1960s, large numbers of Thompsons were demilled by the government and rendered into useless hunks of torch-cut or melted metal.

Of all the World War II military Thompsons variations, the M1928A1 is probably the most popular and prices are usually somewhat higher than for the later variants. The Cutts compensator and the ability to mount the colorful 50-round drum magazine make the M1928A1 a bit more impressive when displayed either in a collection or at a gun show.

M1 and M1A1 Thompsons

The simplified M1 and M1A1 variants are easily distinguished from the M1928A1. The most obvious differences are the relocation of the cocking handle from the top of the receiver to the right side, the elimination of the compensator and the substitution of a permanently attached buttstock rather than the M1928A1's detachable stock. The internal differences included the elimination of the Blish lock mechanism, as well as a redesigned bolt and buffer. As mentioned, the M1 and M1A1 models are not capable of accepting the drum magazine.

The M1 variant did not have the protective rear sight guard but this feature was added to later M1A1s. However, rear sight guards were often installed on the M1 and early M1A1 models when they underwent arsenal rebuilding.

The left side of the M1's receiver was stamped

"Thompson Submachine Gun"
Caliber .45 M1
Serial #

The M1A1 variant had the same type of marking except for the substitution of "M1A1" for "M1". When an M1 Thompson came into an arsenal for rebuilding, it was generally converted to M1A1 specifications by the addition of the bolt with the fixed firing pin. These converted guns were hand-stamped "A1" after the original "M1" marking. Interestingly, some M1A1 models may be observed that were converted into M1 configuration and had the "A1" suffix lined out. This seemingly inconsistent conversion was due to the unavailability of M1A1 replacement parts at a particular repair depot, thus necessitating the utilization of M1 bolts instead of the later M1A1 bolt. Such conversions are not rare but are seen much less frequently than the typical M1 to M1A1 conversion. The converted Thompson of both types are interesting collector variants.

It has been reported that some very early production M1 Thompsons (serial numbers under 10,000) were finished in low grade of blue rather than the typically seen parkerizing. Such guns are rarely encountered since few were made and most of them underwent some form of arsenal refurbishing that generally included parkerizing the metal. Otherwise, all types of WWII-vintage U.S. issue Thompsons were factory parkerized.

Some Thompsons have been commercially produced within the past 20 years by the firm that took over the name of Auto-Ordnance. These guns appear to be well made and are fine for shooting and other uses, but they are not military issue weapons. Some semiautomatic versions of these guns, with longer barrels to comply with Federal law, may also be encountered. Again, these are satisfactory for shooting but do not have any value as martial collectibles.

Thompson Accessories

Magazines

Among the most interesting of the Thompson's accessories are the magazines. The 50 round drum, commercially known as the Type L, has always been a popular and sought after item. The earlier commercial Thompsons used drum magazines made by Colt that were marked "Auto-Ordnance" and "New York, New York". These are proper for the commercial Thompsons and the pre-WWII U.S. Navy Model of 1928 guns. The commercial production 100-round drum magazines, Type C, alluded to earlier were made in very limited numbers

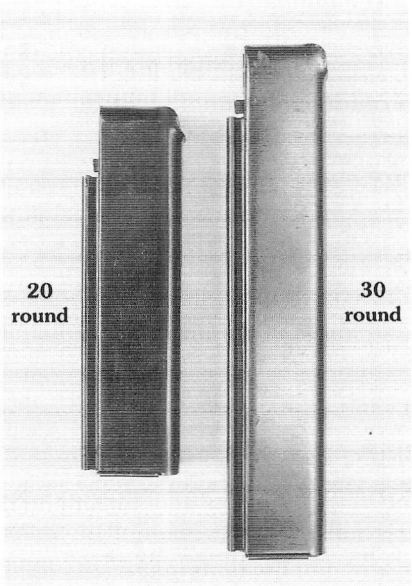
and are quite uncommon and expensive today. Reproduction 100-round drum magazines have been reported recently. The 100-round drum was never issued with any versions of the military Thompson.

Auto-Ordnance produced a number of drum magazines during World War II under government contract which bear Bridgeport, Connecticut, markings.

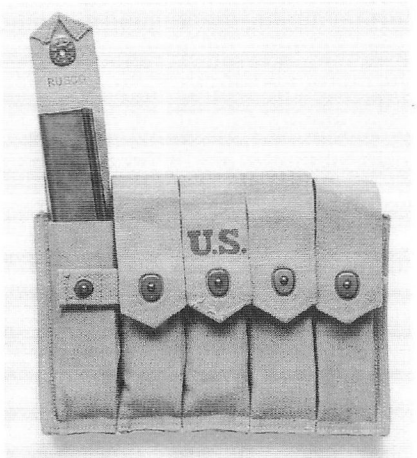
These generally had a higher polished blued finish than the earlier Colt-made drums. Two other firms, the Seymour Products Co. and the Crosby Company, made 50-round drum magazines during the same period. The Crosby drum magazines were typically very poorly made, while the Seymour drums appear to be the equal of the Auto-Ordnance drums. The Seymour and Crosby 50-round drums were rather uncommon until just a few years ago, when fairly large quantities were brought back into the United States from overseas. World War II military issue 50-round drum magazines are now not too hard to find at reasonable prices. In fact, many of these WWII-vintage drums can be obtained in brand new condition in their original cardboard boxes. Of all three World War II variants (Bridgeport, Seymour and Crosby), the Crosby drum is the most difficult to find today but its value doesn't seem to be any greater. A commercial firm has recently made large numbers of reproduction Thompson drum magazines that look much like the military versions but have different markings and a somewhat smaller cartridge capacity. Someone wishing to acquire a World War II drum magazine should be certain he is getting one of the three original government issue variants.

Two basic types of military drum pouches may be found. They are essentially identical, but one style had only a wide belt loop on back and the other type also had an adjustable shoulder sling. Both are usually marked with a bold "US" on the front of the flap and stamped with the year of production inside. These World War II drum pouches are still relatively available today.

The 20-round box magazine, known as the Type XX, was made commercially in several marking formats. During World War II, Auto-Ordnance and Seymour both made 20-round magazines, and the name of the manufacturer was marked on the front edge of the magazine.

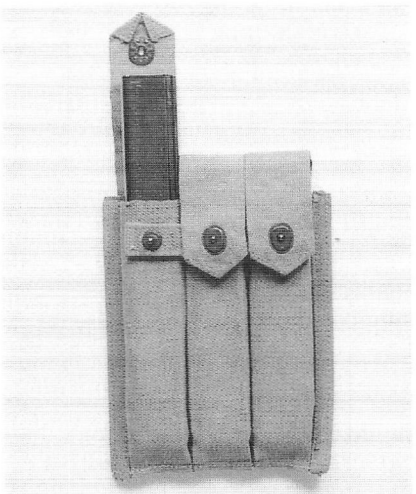


Canvas 20-round magazine pouches having five pockets and a wide belt loop were made during World War II. Many of these were marked "US" on the front flap.



The later issue 30-round box magazine, Type XXX, was made by several firms including Seymour. Like the 20-round magazine, it could be used with all versions of the Thompson. The 30-round magazine was obviously more desirable than the 20-round magazine to the majority of combat troops due to its larger capacity.

The most commonly seen pouch made for the 30-round magazine had three pockets and a very wide belt loop on back. Most examples were marked



"US" on the front, and many will be found stamped with the name of the maker and "USMC" on the loop. Most of the Thompson magazine pouches of all varieties are not difficult to find today in nice condition.

Sling

All three types of WWII-issue Thompsons were generally issued with the M3 sling. This sling was quite similar to the WWI-era Kerr No-Buckl sling but was somewhat shorter and made of a yellowish web material. The M3 sling is commonly found today, and a collector wishing to acquire one shouldn't have too much trouble finding an excellent example.

Manual

Original World War II Thompson Field Manuals and Technical Manuals are not extremely common but can be found from time to time today. Such an item can make a fine addition to a Thompson in a collection and should be obtained when found in good condition at a reasonable price.

Leather Scabbard

A number of Thompson submachine gun leather scabbards were procured dur-

Leather scabbard for the Thompson mounted on a motorcycle.
(Charles K. Canfield, Sr.)

ing World War II for use on jeeps, motorcycles and other vehicles. These are still around today but can be a bit hard to find. The name of the manufacturer and the date of production were stamped on the scabbard.

Few firearms are as instantly recognizable as the Thompson submachine gun. Its popularity with collectors today is rivaled only by its popularity with many of its users during World War II. If someone wishes to have just one representative example of an American submachine gun, the Thompson is the natural choice. Its exploits in the Second World War are often overlooked compared to the weapon's notoriety as a gangster weapon in the 1920s and 1930s. Even though obsolescent by the time it was being produced during the war, the Thompson nevertheless provided valuable service to the forces of freedom during World War II. There are many veterans of the war who are alive today because of the reliability and firepower of the Thompson. This is the greatest compliment that can be paid to a classic American military weapon.

THE M3 AND M3A1

Although the M3 and M3A1 submachine guns saw widespread production both during and after World War II, they are not around on the collector's market today in extremely large numbers. After the war, many thousands of grease guns were given away to allied nations around the world through various military assistance programs. In the 1960s and early 1970s, many of these guns that had been retained in our government inventory were destroyed during the infamous demilitarization programs instituted during this period. Even with these wholesale reductions of the available supply of grease guns, a collector wishing to acquire an example shouldn't have much of a problem. Of course, as is the case with almost all automatic weapons today, the price will invariably be quite steep.

It is probably true that fewer M3 and M3A1 submachine guns are around today when compared to the various models of Thompsons. However, even the later World War II Thompson M1 and M1A1 variants typically seem to sell for more than the M3 or M3A1 guns. The earlier U.S. Navy M1928 and WWII-production M1928A1 Thompsons generally bring quite a bit more than the typical M3/M3A1. As was the case with most soldiers in World War II, the crudely made grease gun doesn't have the appeal with most collectors as does the finely crafted Thompson. There doesn't seem to be a great deal of difference between the value of the M3 and the M3A1 guns, although the latter were made in much smaller numbers. All World War II grease guns were made by Guide Lamp. Ithaca Gun Company made a quantity of M3A1 submachine guns during the Korean War but did not produce any of these weapons during the Second World War.

The designation of the weapon along with the name of the manufacturer ("Guide"), the Ordnance Department crossed cannons escutcheon, "US" and the serial number were marked on the left side of the magazine housing.

Unlike many U.S. World War II weapons, the M3 or M3A1 submachine guns were not marked with the date of production. However, serial numbers aside, the approximate production time of a grease gun can be determined by observation of the specific features. M3 submachine guns made after approximately March of 1944 have metal reinforcing ribs on either side of the "L type" stamped rear sight and have a metal projection, about ⅝" in length, formed on the rear slope of the ejector to function as a cocking trip lever. M3 submachine guns manufactured from the beginning of production until about March of 1944 did not have these features. Since all Guide Lamp M3A1s were made in 1945, determining the date of production is not a problem. Externally, it is quite easy to distinguish a M3 from a M3A1, because the latter does not have the cocking lever on the right side and has a larger ejection port.

Accessories

There are only a few accessories for the M3/M3A1 submachine guns that are of interest to collectors. The most common accessory is the sling. The grease guns were designed to accept the standard web sling as used with the M1 carbine. Since such slings are common today, a collector shouldn't have any problem finding one if needed.

A flash hider was developed late in the war for use on the M3/M3A1 grease guns. This funnel shaped metal flash hider clamped on the end of the barrel in much the same manner as the M3 carbine flash hider.

The 30-round grease gun magazines were made by a number of manufacturers during and after World War II. These were carried in the same type of web pouches as were the 30-round Thompson magazines. Most of these pouches were made of khaki or olive green web material and had three pockets which closed by lift-the-dot fasteners. The pouches were made with a wide belt loop on back and were usually marked with "US" and the date of production. These pouches are still around today and are usually priced quite reasonably.

An interesting ancillary item produced for use with the M3/M3A1 submachine guns during World War II was a 9mm conversion kit. This was developed chiefly for use by OSS personnel operating behind German lines in order to make the use of captured enemy ammunition possible. The M3/M3A1 could easily be converted to 9mm by changing the barrel and bolt. These 9mm conversion kits were not procured for use by the U.S. military.

As we have seen, the grease gun did not play an extremely large role in the Second World War because it appeared in combat in the latter stages of the war. Despite the initially cool reception given the weapon, it eventually acquitted itself and proved to be a reliable and very functional submachine gun. While it may have been equal or superior to the Thompson on the battlefield, the grease gun never came close to acquiring the legendary status of the Thompson submachine gun. On the other hand, the M3A1 submachine gun is still in military service today, while the Thompsons are relegated to museums or martial arms collections. Students of military weaponry who may disparage the ugly old grease gun while extolling the virtues of the beautiful old Thompson should keep this fact in mind!

REISING SUBMACHINE GUNS

The most widely available American submachine gun to today's collectors is the Model 50 Reising. Large numbers of Reisings that were used stateside for police use and security/guard duties have survived the past 50 years. The vast majority of these guns are commercial production guns rather than the less commonly found military issue versions.

In addition to being readily available, the commercial production Reisings are unquestionably among the least expensive submachine guns on the collector market today. The military issue M50 can easily sell for twice the amount of the commercial variant while the much less common folding stock M55 can sell for at least double that of the issue M50.

Basically, the military issue M50 Reisings differ from the civilian guns in the following ways:

(1) Most, if not all, of the military guns have a parkerized finish while the civilian Reisings are blued.

(2) The screw that holds the barreled action to the stock is larger than the civilian type and is knurled to permit it to be easily unscrewed by the fingers. The civilian Reisings require either a screwdriver or other tool to take it apart.

(3) A "P" proof mark is stamped on the barrel just ahead of the receiver on most of the military guns.

(4) The sling swivels are located on the underside of the forend and the stock on the military guns. The civilian Reisings either have sling swivels fastened to the left side of the stock or do not have swivels at all.

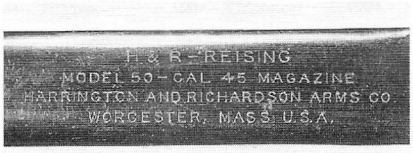
(5) Many, but not all, military Reisings have finger grooves in the stock, but some civilian guns have been noted with this feature as well.

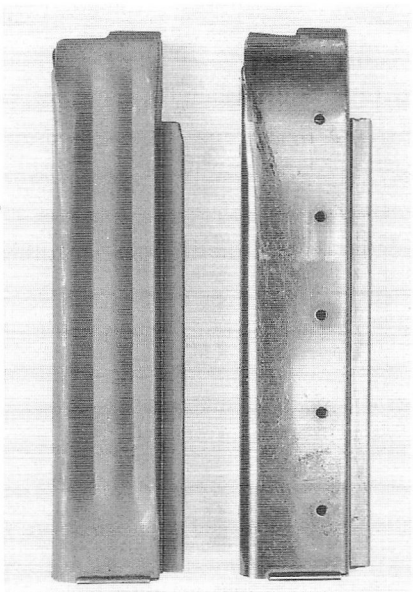
(6) Many of the military issue 20-round magazines were parkerized, although blued magazines were used also. Most, if not all, of the 12-round magazines were parkerized.

Some commercial production Reisings have been subsequently parkerized, so guns with this type of finish should be examined closely. The receiver markings should be crisp and sharp on guns with original finish (either parkerized or blued), and refinished guns generally have less distinct markings.

Original 20-round Reising magazines, especially the parkerized types, have become harder to find within the past few years and prices are typically several times higher than the Thompson magazines. It has been reported that newly made reproduction Reising magazines are beginning to appear. The originals are easy to spot as they are marked on the front face:

H&R - Reising
Model 50 - .45 Cal Magazine
Harrington & Richardson Arms Co.
Worcester, Mass. U.S.A.

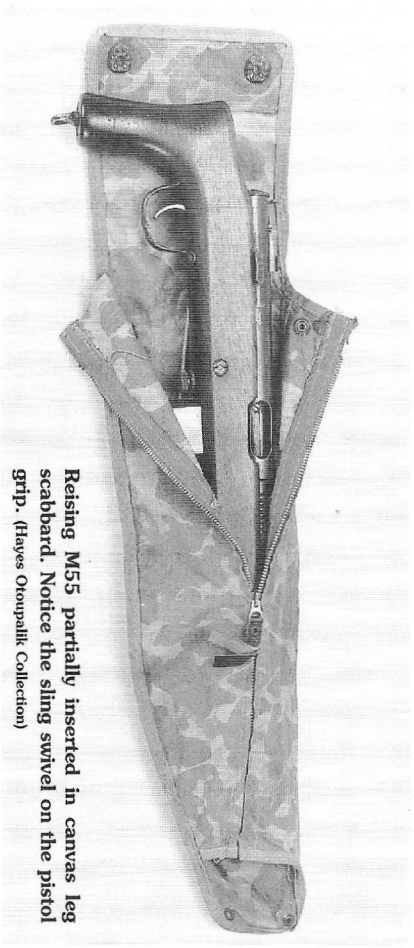




12-round 20-round

The five pocket magazine pouches used with the Thompson 20-round magazines also were utilized for use with the Reising magazines. A few government manuals were printed and H&R produced a combination manual and advertisement catalog for use with the Reising. Several types of slings were used with the military issue Reisings.

Two types of canvas carrying cases for airborne use were procured for the M55 Reising. One variety held the entire weapon (with the stock folded) above the reserve chute attached to the paramarine's chest. The other type was strapped to the leg. The M55 submachine gun was inserted into the case in much the same manner as the M1A1 carbine's scabbard. Both jump cases were constructed of camouflaged canvas and are rarely seen today.



Reising M55 partially inserted in canvas leg scabbard. Notice the sling swivel on the pistol grip. (Hayes Otoupalik Collection)

Despite its shortcomings as a military weapon, the Reising is popular with today's collector. A Reising submachine gun can be obtained today without mortgaging the homestead. The gun is very pleasant to shoot, especially if no one is shooting back! While the weapon may be an unpleasant memory to many World War II Marines, the story of the U.S. submachine guns of World War II cannot be complete without including the Reising.

Automatic Rifles

World War I was the first conflict in which automatic weapons played a large role. Machine guns on both sides took a heavy toll that required revision in tactical thinking and improved weaponry to counter the new threat.

While the unwieldy crew-served heavy machine guns of the day were gruesomely effective in fixed trench positions, there was a need for an automatic weapon that was light enough to be carried and operated by one man. Such a weapon could markedly increase the firepower of an infantry squad that otherwise would be armed with bolt action rifles. The necessity for such a lightweight machine gun, or automatic rifle, spurred ordnance engineers of the belligerent nations to come up with suitable designs capable of filling this void.

One of the earliest such weapons which saw mass production during World War I was the French Fusil Mitrailleur Modele 1915 CRSG, informally but widely known as the Chauchat. It was chambered for the standard French 8mm cartridge. This weapon, referred to by the French as a light machine gun, was actually one of the first true automatic rifles. The weapon was 45" long and weighed approximately 20 pounds. Compared to the typical World War I machine gun that weighed at least 50 to 60 pounds, the Chauchat was much closer in size and configuration to a service rifle than a machine gun.

The French used the M1915 automatic rifles extensively in World War I. While it filled the niche between a service rifle and the heavy machine gun, the Chauchat had one glaring flaw. It was notoriously unreliable. The Chauchat had one of the worst reputations of any military weapon of modern times, and, from contemporary reports, the reputation was justified.

When the United States entered the First World War in 1917, our armed forces were lacking many modern weapons of war with machine guns being among the most notable. Prior to the war, the U.S. had adopted the "Automatic Machine Rifle, Caliber .30, Model of 1909," commonly known as the Benet-Mercie—after its two designers. Based on a design influenced by Benjamin Hotchkiss, the M1909 was very similar to a French gun also adopted in 1909. The American M1909 gun had been used in a very limited role in the infamous border skirmishes against Pancho Villa and his men just prior to World War I, where it proved to be unsatisfactory. The Benet-Mercie has the distinction of being the first weapon in America's small arms inventory that could be classified as an automatic rifle. However, the government only acquired a total of 670 guns prior to World War I. With America's declaration of war, the weapon was not put back into production due to the previously mentioned problems. The M1909 did serve as a training gun and a few were sent to France along with some of the units of the first American contingent. However, for all intents and purposes, the United States entered the First World War in the unenviable position of not having either a suitable automatic rifle or light machine gun in its inventory.

In order to equip the AEF with automatic rifles, a number of Chauchat guns were purchased from the French. In spite of the weapon's unreliability and the fact that it was chambered for a foreign cartridge, it was the only allied automatic rifle available. Later, a number of these guns were rechambered for the U.S. .30-06 cartridge to help simplify supply problems. Unfortunately, the more powerful U.S. cartridge put added stress on the gun's mechanism and these converted Chauchats performed even worse than the original 8mm guns. Clearly, the United States needed a modern automatic rifle and needed it in a hurry.

The Browning Automatic Rifle

Fortunately, legendary gun inventor John M. Browning had conceived of an automatic rifle design several years prior to World War I. However, he had not fully developed the concept since there was little perceived need for such a weapon at the time. With America's entrance into the war, Browning resumed work on his automatic rifle and he fabricated a hand-built prototype less than a month after our declaration of war. On May 1, 1917, the Secretary of War appointed a board to test various automatic rifle designs and select one for adoption. Browning's gun was the clear winner and was adopted and ordered into production on an expedited basis. Browning had previously sold the manufacturing rights for the weapon to the Colt Patent Firearms Company, and the Ordnance Department negotiated with the firm to secure the necessary production rights for "the duration of the war". Both Colt and John Browning were to receive royalties on each automatic rifle manufactured.

WWII Marine with unaltered WWI-vintage BAR. (Our Kind of War)

Since Colt's Hartford, Connecticut, plant was operating at near maximum capacity producing the M1911 .45 pistol and other weapons, the firm wanted to build another facility in Meridan, Connecticut, to manufacture Browning's new automatic rifle. Since this would have meant a lengthy delay in getting the weapon into production, the Ordnance Department turned down Colt's request and other manufacturers were sought to augment the limited production at the existing Colt plant. Winchester Repeating Arms Company and the Marlin-Rockwell Corporation were soon awarded contracts for production of the new automatic rifle.

Model of 1918 Browning Automatic Rifle (BAR)

The first guns began to come off Winchester's production line on December 29, 1917, and Colt and Marlin-Rockwell were in production about a month later. Although the weapon was adopted in 1917, it was given the designation " Browning Machine Rifle, Model of 1918" to prevent confusion with the M1917 Browning heavy machine gun. The weapon was soon widely known simply as the BAR.

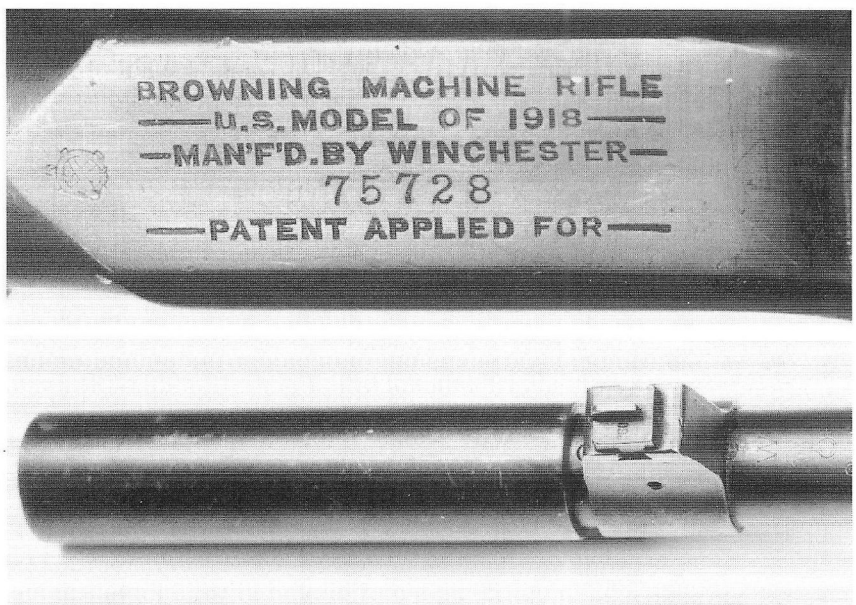
The M1918 BAR was a beautifully crafted weapon with a massive receiver machined from a solid steel bar. It was finished in commercial grade blue and had good quality walnut stocks and checkered forends. The gun was capable of semi-automatic operation and could be fired fully automatic at the rate of about 500 rounds per minute. The M1918 BAR weighed 16 pounds (unloaded) which, considering the weight of contemporary automatic weapons, was very light. It was chambered for the standard M1906 (.30-06) cartridge and utilized a detachable 20-round box magazine.

The role envisioned for the Browning Automatic Rifle was to provide "marching fire" to keep the enemy's heads down in their trenches as our infantry moved to the assault. BARs were sent to France as soon as production allowed and they first saw action on the Western Front in July of 1918. The BAR gained immediate popularity with the Doughboys, especially compared to the wretched Chauchats.

As reported by Assistant Secretary of War, Benedict Crowell,

The Browning Automatic Rifles were highly

Model 1918 Browning Automatic Rifle. Although large numbers of M1918 BARs were converted to the later M1918A2 specifications, many unaltered M1918s were used in WWII.



(above) Left side of an M1918 BAR receiver. Note the lack of magazine guide ribs as found on the later M1918A2 variant and the fire selector lever that allowed for semiautomatic and fully automatic fire. The M1918 BAR's rear sight was identical to the M1917 Enfield rifle.

(left, top) Typical receiver markings on M1918 BAR. This example was made by Winchester in August of 1918.

(left, bottom) M1918 BAR flash hider. The M1918A2 flash hider was of a different configuration and was the point of attachment for the bipod.

praised by our officers and men who had to use them. Although these guns received hard usage, being on the front lines for days at a time in the rain and when the gunners had little opportunity to clean them, they invariably functioned well.

Our French, British and Belgian allies also were greatly impressed with the BAR and requested large numbers of the weapons. These requests were denied until our armed forces had been fully equipped with BARs. Sufficient numbers of BARs were beginning to be on hand at the time of the Armistice.

After World War I, the BAR was the standard automatic rifle for the U.S. Army, Navy and Marine Corps. It was used, particularly by the Marines, between the wars in a number of military hotspots around the globe where its success in World War I was repeated numerous times. In 1922, the Army adopted a modified version of the BAR as the Model 1922, which was intended for use by the cavalry. Only a few hundred were made, and the weapon was dropped from use a number of years before the beginning of the Second World War.

M1918A1
Browning Automatic Rifle

In June of 1937 another modification of the original M1918 BAR was adopted as the M1918A1. This weapon featured a folding bipod attached to the gas cylinder and a hinged buttplate to assist in keeping the weapon on the shoulder when fired. The M1918A1 was selective fire operation (semiautomatic and fully automatic) like the M1918 BAR. The bipod and folding buttplate assembly increased the weight of the weapon from 16 pounds to about 18.5 pounds. No new production M1918A1 BARs were manufactured, since they were converted from existing M1918 models. The exact number of guns so modified is not known but is not believed to have been very large.

M1918A2
Browning Automatic Rifle

The final mass produced U.S. variant of the BAR was adopted and first issued in 1940. The M1918A2 Browning Automatic Rifle was similar to the earlier M1918A1, although it differed from this weapon and the original M1918 model in some respects.

(1) A folding bipod, adjustable for height with skid-type feet was mounted on a special flash hider near the end of the barrel. The M1918 did not have a bipod, while the M1918A1 utilized a folding bipod with spiked feet mounted on the gas cylinder.

(2) An unusual removable monopod butt rest was added when adopted, although this feature was soon dropped from use.

(3) The forend was cut down in height to expose more surface of the barrel to aid in cooling and to help prevent charring of the wood.

(4) The M1917 Enfield pattern rear sight used on the M1918 and M1918A1 BARs was replaced by a sight very similar to that used on the M1919A4 .30 caliber machine gun.

(5) Guide ribs were added in front of the trigger guard to assist with inserting magazines.

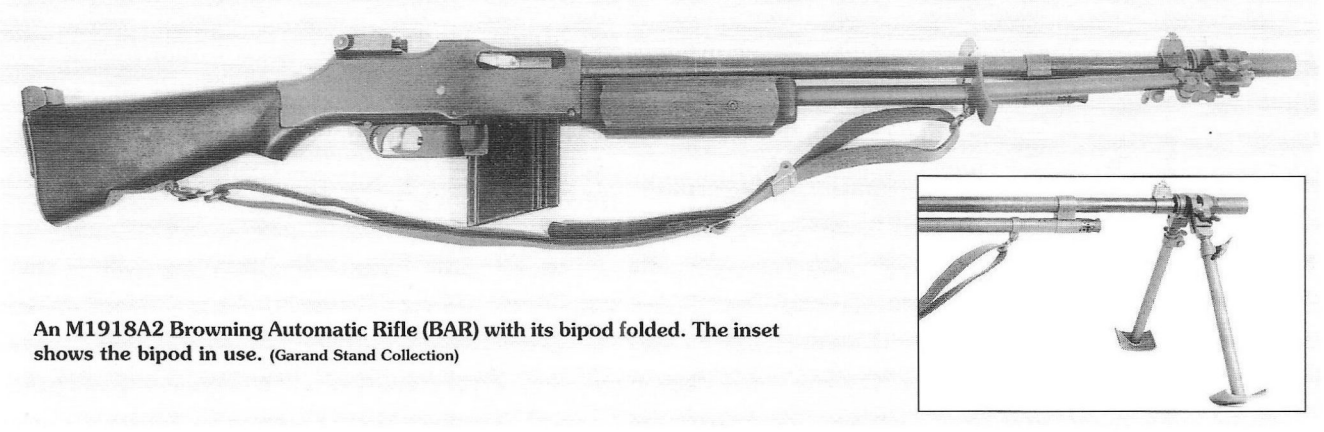
(6) A folding buttplate assembly similar to the one used on the M1918A1 BAR was utilized.

(7) The M1918A2 could only fire in the full automatic mode (it was not capable of semiautomatic fire like the M1918 and M1918A1 BARs). The 'A2 operated in either slow or fast modes firing 300-450 and 500-650 rounds per minute, respectively. The M1 Garand rifle had been adopted prior the M1918A2 BAR and a 20-pound weapon capable of semiautomatic operation was felt to be unnecessary with the 10-pound Garand around.

These additions raised the M1918A2's weight to almost 20 pounds. This was quite a hefty increase but was deemed worthwhile considering the added utility these improvements were thought to add to the original M1918 BAR design.

The first M1918A2 BARs were converted from existing M1918 and M1918A1 versions. Springfield Armory records indicate that 8,375 M1918 BARs were converted to M1918A2 configuration during Fiscal Year 1941, and it has been reported that a total of 188,380 M1918s were eventually converted to M1918A2s. This partially accounts for the relative scarcity of the earlier versions. A number of M1918 Browning Automatic Rifles were supplied to Great Britain under the Lend-Lease program, and these were not subjected to rebuilding to M1918A2 standards.

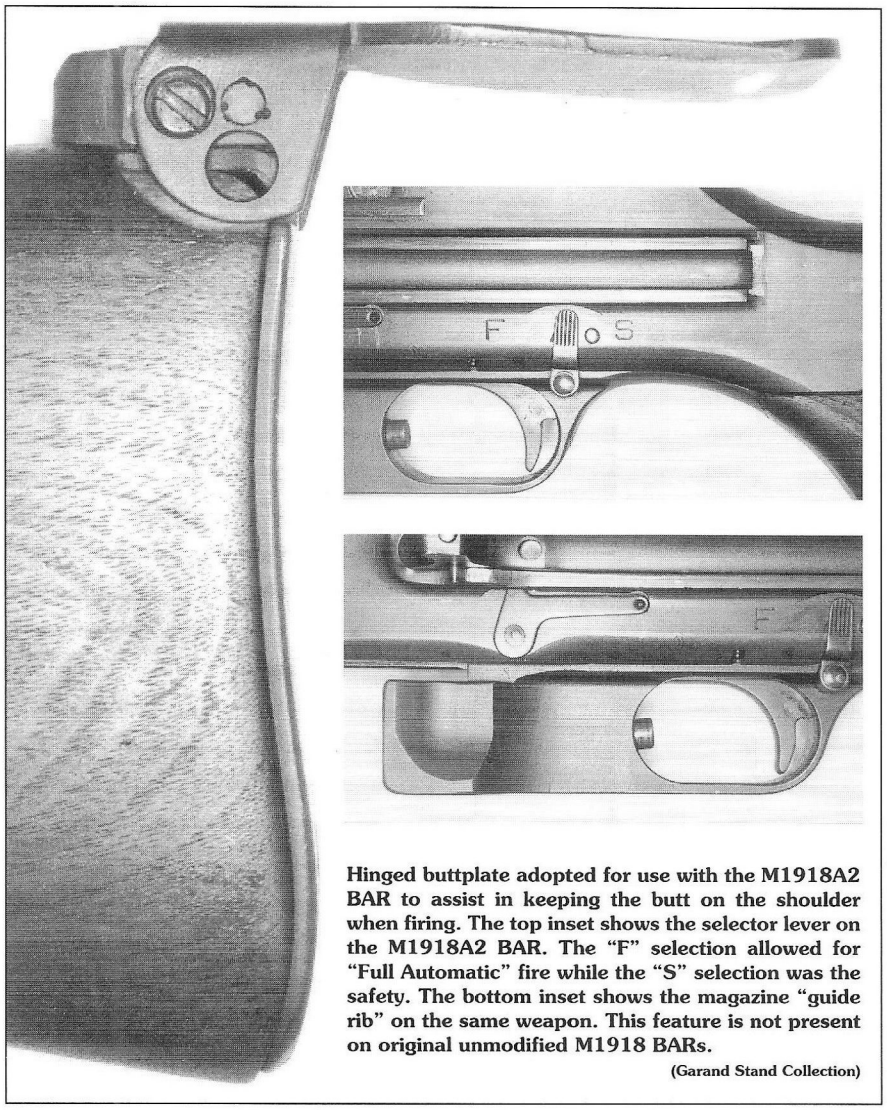
As the United States entered the Second World War, the demand for BARs dramatically increased. The supply of First World War vintage guns was rapidly being depleted, and the Ordnance Department contracted with two commercial firms, International Business Machines (IBM) and New England Small Arms. IBM's initial contract was for 20,000 BARs, and New England Small Arms was awarded a comparable con-



An M1918A2 Browning Automatic Rifle (BAR) with its bipod folded. The inset shows the bipod in use. (Garand Stand Collection)

tract. The two firms received additional contracts and delivered a combined total of 208,380 M1918A2 Browning Automatic Rifles to the government by the end of World War II.

With the pressure of increased production, the Ordnance Department evaluated ways to speed up BAR production. Lower grades of steel were tested and other manufacturing shortcuts were tried, but little could be done to substantially reduce the BAR's manufacturing time. The checkered forend of the M1918 BAR was replaced by a shorter plain forend. The monopod butt rest was quickly dropped as its usefulness was questionable. In March of 1942, a plastic buttstock was substituted for the walnut buttstock. Later in the war, a carrying handle mounted on the barrel was standardized to assist in carrying the BAR. As stated, these additional features added substantially to the M1918A2's weight, which was in excess of 20 pounds. Lt. Col. John George makes an interesting observation in his book *Shots Fired in Anger.*



Hinged buttplate adopted for use with the M1918A2 BAR to assist in keeping the butt on the shoulder when firing. The top inset shows the selector lever on the M1918A2 BAR. The "F" selection allowed for "Full Automatic" fire while the "S" selection was the safety. The bottom inset shows the magazine "guide rib" on the same weapon. This feature is not present on original unmodified M1918 BARs.

(Garand Stand Collection)

At the onset of the war our old BAR had been much changed from its original person, in both appearance and function. Ordnance had thrown in a lot of gadgets—buttrests and bipods and hooked buttplate—on both ends of the poor weapon so that the man carrying it looked from a distance like a traveling tin shop. This was an effort to give the weapon long range accuracy and sustained steadiness throughout long bursts; a typical American attempt to substitute gadgets for skill. The BAR as originally issued was wonderful in the hands of a good man. The gadgets worked beautifully on the range—the gun would practically fire itself and on the thousand inch target it would hold to a burst smaller than some of our heavy machine guns fired with tripods firmly sandbagged.

Seeing this—back in 1940—we all congratulated ourselves on having such a splendid weapon, but not for long. Two weeks after we were on Guadalcanal we had thrown away all of the gadgets and were using the guns stark naked—the way old John Browning had built them in the first place. The only times the bipods and buttrests were worthwhile were in long range sniping from hilltop to beach, opportunity for which was rare in occurrence. We did, however, make good use of the guns we stripped down.

Melvin M. Johnson, inventor of the M1941 Johnson rifle and light machine gun, seconded Col. George's observations about the discarding of the BAR's bipod during World War II in an article he wrote for the *Infantry Journal.*

So far as can be determined from an informal extensive investigation, nearly all M1918A2 BAR men "lost" their bipods in combat. The 2.38 pound bipod could readily be detached from the flash hider. It definitely was!

The oft-cited 1943 Marine Corps evaluation of infantry weapons used in the Pacific contains the following paragraph about the BAR.

Browning Automatic Rifle, cal. 30, M1918A2.

A Marine on Wana Ridge, Okinawa, 1945, firing an M1918A2 BAR. As can be seen, the bipod has been removed to save weight, which was very commonly done during the war. The BAR was extremely popular with the majority of its users and was a reliable and deadly weapon. (USMC)

This weapon continues in popularity. It functions under all conditions, with few exceptions and stoppages, and has the striking-penetrating power desired in the jungle. Each man should have a chamber cleaning brush in his kit. The 1918 model is preferred to the 1918A2.

The above quotes certainly cast some doubts concerning the M1918A2 variant and whether it was really an improvement over the original M1918 BAR. It is reported in *International Armaments, Vol. II* that

The U.S. Marine Corps preferred the semiautomatic feature in certain tactical situations, and modified most of its M1918A2 guns to make them capable of semi-automatic, as well as full-automatic fire.

As the only automatic rifle in the United States' inventory at the start of the war, the BARs were immediately in the thick of fighting. The demand for the weapon increased steadily. As an example, the Tables of Equipment for a Marine Division authorized 513 M1918A2 BARs in 1942, which increased to 558 in 1943, 853 in 1944, and 867 in 1945. Army requirements showed a comparable steady increase.

Although still classified as an automatic rifle, the BAR was actually used in the role of a light machine gun. As stated by Konrad Schreier, Jr.,

The BAR used in WWII was actually a Light Machine Gun which could fire full-auto only, but its WWI version could fire semi-auto or full-auto and that got it the name BAR which stuck through the end of its use. In WWII the U.S. Army's tactical system called the BAR the "squad's base of fire" in some instances, and in others referred to it by a name now in common use; "squad automatic weapon"...

As the war progressed, many infantry squads were given an extra member consisting of a BAR man. Even with the increased allowances, many units desired to obtain additional BARs whenever (and however) possible. The book *Semper Fi Mac* relates a conversation between a Marine officer stationed on the USS *Randolph* and a fellow Marine visiting the ship prior to returning to his ground combat unit.

Tom, Red asked, do you have any extra BARs? You know that is something we never have enough of. This next fight (Okinawa) is going to be close to Japan. If you have any, we could put them to good use.

It turned out that each detachment like mine did have two BARs. My first sergeant bitched like hell, telling me I could be court-martialed for giving them away, but the hell with that. The 3rd Battalion, 1st Marines made that April Fools' Day landing on Okinawa with the Randolph's BARs. What was I going to use them for, repelling boarders?

The popularity of the BAR was due to several reasons. The chief reason was that unlike the .45 caliber submachine gun, the BAR's .30-06 cartridge provided ample power and penetrating ability. The BAR combined firepower with reasonable portability and good

M1918A2 Browning Automatic Rifle firing from prone position with the bipod extended. This is an example of an early variant, likely converted from an M1918 BAR, as evidenced by the cut-down checkered forend. (U.S. Army)

accuracy. It has been said that the BAR's original role was filled somewhat by the semiautomatic M1 Garand, which was capable of a fair amount of firepower in its own right. This is true to some extent, but the BAR's firepower exceeded that of the Garand by several times. The two weapons complemented each other in the infantry squad. An interesting observation regarding the popularity of the BAR's firepower appears in the book *Shots Fired in Anger.*

Actually, I believe our fondness for the BAR was more concerned with the type of fire than with the weapon itself. We would have been equally pleased with the Bren gun—perhaps more so. What we yearned for was a good gun to throw a lot of lead, faster and harder than the Tommy Gun. This the Browning did, moderately well.

One of the recurring complaints about the BAR was its weight of over 20 pounds. Many troops did not look forward to lugging around such a heavy weapon. However, when faced with the stark realities of combat, the powerful and fast firing BAR did not seem so heavy after all. An official World War II Marine Corps narrative alluded to this.

...the 22d Marines lacked the prescribed number of rifles and automatic rifles. Before the operation began, many Marines had discarded these weapons in favor of carbines, but the bullets fired from the lighter weapons lacked the killing power of rifle ammunition. 'The BARmen and riflemen,' recalled an officer of the 22d Marines, 'seemed very happy to discard their carbines and take up their former weapons...'

Even though the BAR gave generally excellent service to the GIs and Marines during World War II, the weapon was not without problems. A number of World War II veterans may resent any criticism of the BAR since the weapon served them so well during the war. As a British writer aptly pointed out, "Critics of the BAR have to tread warily, because this gun arouses the same feelings of loyalty in ex-GIs as does the Bren in Britain." In order to present a balanced picture, however, it is necessary to discuss the BAR's weaknesses.

One serious drawback inherent in the BAR's basic design was the lack of a quick change barrel. As fully automatic rifles and light machine guns are required to lay down sustained volumes of fire, the problem of overheated barrels always exists. A number of World War II foreign automatic rifles and light machine guns featured barrels that could be quickly and easily changed in the field. The BAR's barrel was designed to be permanently attached to the receiver and could only be changed in an ordnance shop. This obviously limited the BAR's sustained firepower capability.

The gun's magazine also caused a number of problems. Its limited 20-round capacity was too small to make use of the BAR's rate of fire and the magazine itself was not very sturdy and could be damaged easily. Improved magazines with larger capacities were requested but not adopted.

While state of the art in 1918, the BAR was actually something of an anachronistic weapon by the time of the Second World War. It was too heavy to function effectively as a *modern* automatic rifle and did not have the sustained fire capability of a true machine gun.

The Ordnance Department was well aware of the BAR's shortcomings, and many avenues were explored to improve the gun's utility. Some experimentation was done to adapt the BAR to belt feed in an attempt to increase the gun's sustained firepower, but the results were less than satisfactory. Some testing was done with quick change barrels, but this would have required extensive modifications to the basic receiver design and was not deemed feasible.

Since it was not possible to markedly improve the BAR, other weapons were looked at as possible replacements. Two of the most successful light machine gun designs of World War II were the British BREN and the German MG42. The BREN was arguably a better (and newer) design but was not sufficiently superior to warrant scrapping the BAR in the middle of a war. The German MG42 was a light machine gun rather than an automatic rifle, but it could (and did) function in both roles. While several pounds heavier than the BAR, the MG42 utilized a belt feed mechanism and had the very desirable quick-change barrel feature. Many American troops who faced the MG42 in combat firmly believed that it was one of the best weapons of the war, and many believed that the United States should simply adopt the gun "as is" for issue to our troops.

It is a little known fact that the Saginaw Steering Gear Division of General Motors, one of the prime contractors for the M1 carbine, actually hand-built two nearly exact copies of the MG42 chambered for the U.S. .30 caliber (.30-06) cartridge. The modified weapon was tested but its functioning was unsatisfactory and the project was dropped. It was later discovered that Saginaw had not allowed for the dimensional differences between the German 8mm cartridge and the American .30 caliber, which made proper functioning impossible. As stated in *International Armament,*

But for a quarter-inch miscalculation by an American engineer, the MG 42 could have been

adopted by the United States Army during World War II.

However, admiration for the MG 42 was not universal. An opposing viewpoint is stated by Konrad Schreier, Jr.

When I was attached to Aberdeen in the late 1940's and went through the Ordnance School I had an unparalleled chance to not only shoot all the US stuff, but a lot of the foreign Allied and hostile stuff. It is the way I found out that the German MG42 was not up to its press: it was not at all accurate, it overheated very easily, and it was very sensitive to dust, dirt, and gunk from its own firing.

In any event, the MG42 did have some valuable features, many of which were later utilized on the BAR's successor, the M60 machine gun. The M1918A2 BAR remained the standard issue U.S. squad automatic weapon of World War II.

In July of 1945, the unaltered M1918 and M1918A1s still in service were officially declared as Obsolete and the M1918A2 retained the Standard classification.

The BAR was placed back into production during the Korean War and several thousand were made by the Royal McBee Company. It was retained in U.S. service for a number of years after the M60's adoption in 1957 and the weapon saw service well into the Vietnam War. Its reputation as a classic American combat arm is secure in the history of military weaponry.

Model of 1941 Johnson Light Machine Gun

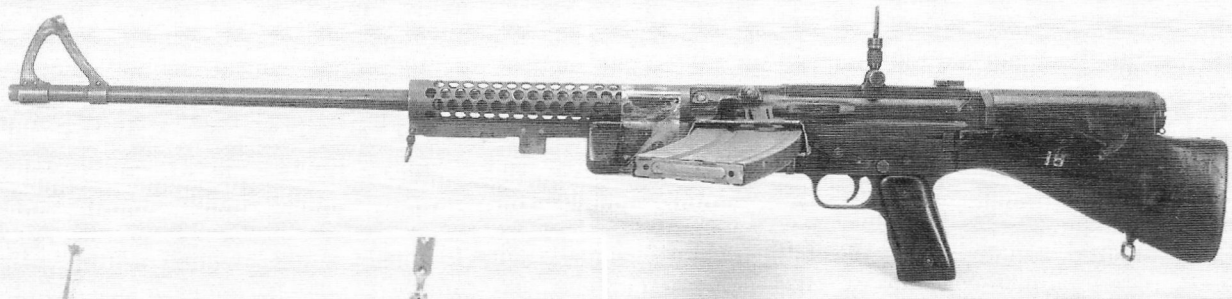
The only other weapon tactically similar to the BAR that was fielded during World War II by the United States military was the Model of 1941 Johnson Light Machine Gun. In spite of the light machine gun nomenclature, the design could technically, like the BAR, be properly classified as an automatic rifle. As stated in *International Armament, Vol.II,* "Since the gun (M1941 Johnson LMG) did not use a belt feed, the Army and Marines classed it with the BAR and officially considered it an automatic rifle."

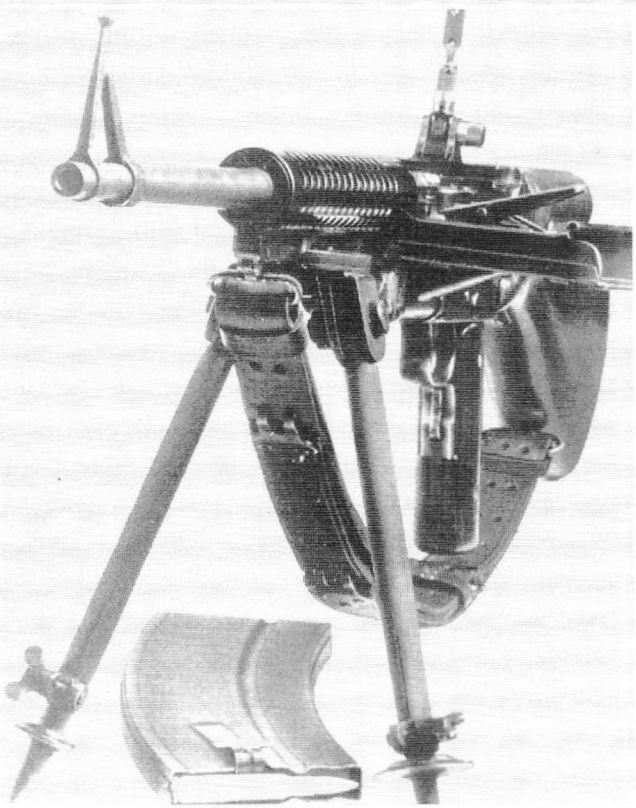
Invented by Melvin M. Johnson, designer of the Model of 1941 rifle, the M1941 LMG shared many similarities with its semiautomatic counterpart. It was manufactured by the same firm—Cranston Arms Company in Providence, Rhode Island—that produced the M1941 Johnson rifles.

Like the Johnson rifle, the LMG utilized the same type of short-recoil operation, and the receivers and other features of the two weapons were very similar. The weapon was capable of semiautomatic operation and could fire standard M2 (.30-06) cartridges fully automatic. The cyclical rate of fire could be varied from approximately 300 to 900 rounds per minute. The gun was 42" overall and the standard barrel was 22" long, although different lengths were tested. In order to decrease muzzle rise, the gun was designed to have a straight line recoil thrust that necessitated a high front sight. The specially designed rear sight, made by either Lyman or Marbles, was capable of fine adjustments and could be folded down when not in use. A bipod was fitted which could also be folded back when necessary. Sling swivels were fitted.

In addition to its rather novel recoil operated mechanism, the M1941 LMG had several very innovative and useful design features. It weighed (without magazine) only 12.3 pounds, substantially less than the

Melvin M. Johnson, inventor of the Johnson rifle and Light Machine Gun. Johnson, who was a Marine Corps reserve officer, is shown holding an M1941 LMG.
(Steel Magazine)





(above) Two views of the M1941 Johnson Light Machine Gun. The bipod has been removed from this example. Be sure to notice the 20-round magazine. (Hayes Otoupalik Collection)

(left) Frontal view of an M1941 Johnson Light Machine Gun with extended bipod and M1907 sling. Note the high front sight and the adjustable rear sight. A Johnson LMG magazine is shown between the two bipod legs. (Steel magazine)

BAR. The weapon fed from a 20-round detachable box magazine that was inserted into the left side of the receiver. Additional rounds could be added from the right side of the receiver either by single rounds or via the five-round '03 stripper clip, without removing the magazine. This enabled, for example, several tracer rounds to be inserted while keeping the balance of the magazine in reserve. One very valuable feature was the fact that the feed lips that guided the cartridges into the chamber were an integral part of the receiver. Since the feed lips were machined from solid metal, they were not subject to deformation and subsequent misfeeding as were other conventional detachable box magazines.

Another interesting feature of the M1941 was its ability to fire in the semiautomatic mode from a closed bolt and in the fully automatic mode from an open bolt. This gave the advantage of increased accuracy when firing semiautomatic but allowed the cooling effects of open bolt operation to prevent "cook offs" from an overheated chamber when firing fully automatic.

Like the M1941 Johnson rifle, the M1941 LMG's barrel could be easily and quickly removed. This elim-

inated one of the BAR's major liabilities of a permanently attached barrel. With the Johnson, extra barrels could be carried, which enabled the weapon to have a greatly increased sustained fire capability when compared to the BAR.

Johnson designed his automatic rifle as a replacement for the venerable BAR, but, like his rifle, the M1941 LMG was never widely issued. Fairly large orders for Johnson Light Machine Guns were placed with the Cranston Arms Company by the Netherlands government, but, as was the case with the Johnson rifle, few were delivered to the Dutch East Indies prior to their capture by the Japanese. The balance of the guns manufactured on the Dutch contract were embargoed to keep them from falling into enemy hands.

The Ordnance Department obtained five M1941 Johnson LMGs in August of 1942 for testing and evaluation. These were tested at the Aberdeen Proving Ground and by the Infantry Board, but no recommendations for adoption were forthcoming and the Army continued with the BAR.

Since the Marine Corps could not get enough BARs to satisfy its needs early in the war, it took a look at the Johnson LMG. The Marines conducted their own Equipment Board testings at Quantico, Virginia, which revealed that the weapon had a number of good features. Although the BAR remained the standard automatic rifle, the Marine Corps procured a quantity of Johnson LMGs. These were primarily intended for issue to the Marine airborne units and other specialized outfits, such as the Raiders. However, the standard Table of Organization & Equipment for a regular Marine Division in 1942 authorized 87 Johnson Light Machine Guns, as well.

By most accounts, the Johnsons were generally popular with the Marines who used the weapons. The gun received a glowing review in the Marine Corps' "Report on Infantry Weapons in Combat" by a Raider unit on New Georgia Island. The section on the Johnson concluded:

Johnson Light Machine Gun, M1941. Operated smoothly under adverse conditions. Very little maintenance needed. Men now armed with them wouldn't trade them for any other. Suitable magazine carriers should be furnished.

In addition to being used by the Marine Corps units, some M1941 Johnson LMGs were also issued to the Army's First Special Service Force. The unit was equipped with a variety of standard and non-standard weaponry (such as the V-42 stiletto discussed previously). Since airborne operations were part of its training, the Johnson LMG attracted the attention of the First Special Service Force (FSSF). It has been reported that the FSSF acquired 147 M1941 Johnson LMGs from a Marine Corps Raider unit in an unusual swap for some newly-developed RS explosive compound.

Two members of the U.S. Marines' 3rd Parachute Battalion (Co. L) on New Caledonia, 1943. The Marine at the left is holding an M1941 Johnson LMG that has had the bipod removed. The Marine on the right has an M1A1 carbine. (U.S. Marine Corps)

A member of the First Special Service Force with an M1941 Johnson LMG. Note the raised rear sight. The Force was originally conceived and equipped for winter combat, hence the fur-lined parka. This was the only U.S. Army unit known to have been issued the M1941 Johnsons. (U.S. Army)

The FSSF was the only Army unit believed to have been issued the weapon although it has been reported (without confirmation) that some Army Rangers used Johnson LMGs. While more information about the Marine Corps' experience with the Johnson has been recorded, it appears that the weapon was generally well liked by its Army users.

As was the case with the Johnson rifle, War Department records reveal that the United States offered to sell to the Free French government some 1,500 M1941 Johnson Light Machine Guns in April of 1943. It has not been confirmed that the French ever acted on the offer.

Approximately 10,000 M1941 Johnson Light Machine Guns were manufactured, although fewer were procured by the United States government during World War II for use by the Marine Corps, FSSF and the OSS. All of these guns were manufactured by the Cranston Arms Company.

Despite its popularity with many of the Marines and members of the First Special Service Force, not everyone was enamored with the Johnson LMG. R.G. "Rudy" Rosenquist reports that "...the 'paras' (Marine paratroopers) thought very little of discarding these weapons when out of ammo." Other Raiders who may have liked the Johnson LMG complained about the lack of suitable means to carry its magazines. The standard BAR and other magazine pouches would not fit the curved 20-round Johnson magazine. Since the Johnson was a non-standard weapon, such accoutrements as magazine belts were not procured. Some users disliked the side-mounted magazine's tendency to unbalance the weapon by placing more weight on the left side. Others complained about the propensity of the side-mounted magazine and the high front sight to snag on vines and other undergrowth when moving through the jungle.

No formal evaluation of the durability of the Johnson LMG in combat was done during World War II. However, there were some reports indicating that the basic design, like that of the Johnson rifle, was a bit too fragile and delicate for extended military use. The long, unsupported barrel and some internal components were not durable enough for the rigors of combat. Some comments were made pertaining to the weapon's tendency to frequent jamming after extensive firing. It should be pointed out that the Johnson LMG was not alone in this criticism.

An improved version of the M1941 Johnson light machine gun was designed to eliminate some of the defects of the M1941 gun. The improved weapon was tested at the Aberdeen Proving Grounds in December of 1943, and it was revealed that functioning was "...generally very satisfactory under normal conditions, but unsatisfactory under adverse conditions of mud, cold and dust..."

Further refinements resulted in the "Model 1944 Johnson Light Machine Gun". The M1944 Johnson LMG was thoroughly tested by the Marine Corps Equipment Board and the weapon was recommended for adoption as a replacement for the BAR. However, this recommendation was rejected by the Commandant in July of 1944. It was felt that the height of a war was not the time to "change horses in the middle of a stream." Also, the Commandant stated that "..the Marine Corps is a customer of the Ordnance Corps in small arms matters, and consequently is reluctant to adopt an automatic shoulder weapon which is not Army standard." However, the Marines did not close the door on the M1944 Johnson LMG as the Commandant concluded that "..the Corps desires to lend impetus to the continued development of the Johnson light machine gun, and stands ready to perform such functions in that connection as may be considered desirable."

M1944 Johnson LMG.
(Small Arms of the World)

The Army placed an order for 10 M1944 Johnson LMGs for testing. These guns were delivered in June of 1945 and the war ended before any extensive evaluation could be conducted.

Further post-war work by Johnson resulted in the Model 1946 light machine gun, which ultimately was of little interest to the American military after some preliminary testing. By the late 1940s, Johnson dropped further development of his light machine guns. All of his designs showed some impressive features, many of which were ahead of their time. If the M1941 LMG had been adopted as standard by the military and the Ordnance Department put to work on improving the gun, it could well have turned out to have been one of the premier weapons of the war. Instead, its use was very limited and was forever in the shadow of the legendary BAR. It is unfortunate that the Johnson LMG, like the Johnson rifle, remains a little-known weapon. Nevertheless, as the report on Marine weapons used on New Georgia Island stated, "Men now armed with them wouldn't trade them for any other." In wartime, this probably constitutes the highest possible praise for a weapon.

Collector Notes

BROWNING AUTOMATIC RIFLES

All versions of the Browning Automatic Rifle are quite popular with a number of collectors today. Even though they were made in larger numbers, the WWII M1918A2 BAR seems to have roughly the same value, given comparable condition, as the WWI-era M1918. Such variants as the M1922 and the M1918A1 are much less common than either the M1918 or the M1918A2 and prices are typically quite a bit higher. The post-WWII M1918A2 BAR manufactured by Royal McBee is generally in the same approximate price range as the WWII 'A2. Some collectors prefer the original unmodified M1918 BAR as the weapon would be appropriate for both World War I and World War II collections. In addition, the attractive commercial grade blue, the walnut buttstock and the checkered walnut forend make an unaltered M1918 BAR among the most attractive fully automatic military weapons around. The M1918A2's dull parkerized finish, plastic buttstock and plain forend does not have the aesthetic appeal of the earlier M1918.

As discussed, many of the M1918 BARs were supplied to Great Britain in the early days of World War II under the Lend-Lease program and thousands of these have been reimported back into the United States since the 1950s. These are usually found in original unaltered condition and can be identified by the English proof marks on the receiver and barrel. Original configuration M1918 BARs without these British proofs are fairly scarce and would likely bring a bit more on the collectors' market.

There are several things to look for when evaluating any type of BAR for purchase as a collector's item. The first thing to determine is that the receiver is not one of the hundreds of thousands that were demilled by the government in the 1960s and 1970s by mutilating them in several places with a cutting torch. The destroyed receivers were sold as scrap, and a number were subsequently salvaged by welding up the torch cuts and refinishing the receivers. By adding surplus barrels and other parts, such guns were then legally registered as newly manufactured machine guns and sold. These guns may appear to be "GI" items as the name of the government contractor on the receiver is still legible in most cases. If the welding and refinishing were properly done, such guns can serve as shooters, but their collector value is nil. Other things to look for are BAR receivers that have been commercially made and fitted with surplus barrels and other parts. These newly made receivers had to be registered with the ATF but the practice of manufacturing new receivers and/or machine guns for the civilian market has been halted since 1986. As with the welded receivers, these guns can be fine shooters but are not suitable if one is seeking an original military issue BAR. Since there are still many of these ersatz BARs around today, a person wishing to acquire an original GI BAR should be certain that the receiver has not been welded and has been made by one of the following manufacturers:

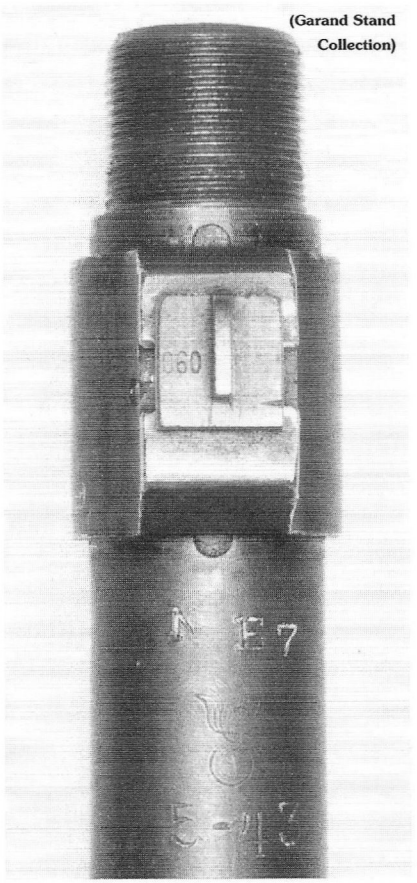
M1918
Winchester, Colt, Marlin-Rockwell

M1918A2 (World War II)
IBM, New England Small Arms

M1918A2 (Korean War Mfg.)
Royal McBee

(Garand Stand Collection)

After determining that the receiver is original, uncut government issue, the barrel should be examined. After checking to be sure that the rifling hasn't been shot out, the markings behind the front sight should be examined. On original factory condition BARs, the initials of the manufacturer and the month and year that the barrel was made were stamped in this location. For example, the M1918A2 BAR illustrated in this book has a barrel marked "NE 5-43", indicating that it was made by New England Small Arms in May of 1943 (see photo this page). This corresponds with the receiver manufacturer, and the serial number corresponds with the same time frame that the barrel was made. A barrel manufactured by a different contractor or a date that varies significantly from the vintage of the receiver is proof that the weapon is not "as issued." However, many BARs were rebuilt by various government arsenals during and after World War II and mixed



(Garand Stand Collection)

parts, including barrels, are the norm in such guns. As is the case with most other weapons, rebuilt guns are not as valuable or sought after as totally original and unaltered guns. This should not be construed to mean that such guns are undesirable. An arsenal rebuilt BAR in nice condition is a legitimate and interesting gun for collecting and shooting purposes.

Original condition M1918 BARs should have bluing on all external metal parts, and a M1918 BAR having parkerizing on any (or all) parts has been refinished. While all M1918A2 BARs were parkerized, the weapon should be examined to ascertain if the finish is original. The crispness and sharpness of the markings are the best way to determine if a gun has been refinished. Shallow and indistinct markings are commonly found on reparkerized guns. A refinished weapon is not as valuable as one with original finish.

Some BARs are acquired strictly for recreational shooting purposes with no thought as to the collecting aspects. If that is the case, then the type of receiver, the maker and date of the barrel and the type of finish are unimportant. However, if a person is contemplating the purchase of a BAR, it should be pointed out that original government issue BARs are often not too much more expensive than

a put-together gun. The GI guns are just as good for shooting and have the distinct advantage of more rapid price appreciation.

Accessories

Magazines

The most important BAR related item is the magazine. All government issue BAR magazines have a 20-round capacity. The WWI-issue magazines were blued as were a number of early production World War II BAR magazines. As production continued in World War II, parkerizing was substituted. Fortunately, BAR magazines are still around today in large numbers at reasonable prices. The blued magazines may bring a little more than the parkerized variety but the difference is slight. Either type would be correct for a Second World War BAR.

Cartridge Belts

As with the magazines, BAR cartridge belts are still commonly found today at attractive prices. The WWI-issue BAR belt was made of khaki material and had an unusual metal cup on the right side. This held the butt of the weapon as required in the marching fire method of operation envisioned for the BAR at that time. The belt also had a two pocket pouch for M1911 .45 pistol magazines. An assistant gunner's belt was also made that lacked the metal cup and had '03 clip pouches rather than the .45 magazine pouch. The World War I belts were marked inside with the maker and date of production. Some of these belts were modified for use in World War II by having the metal cup removed and an extra magazine pocket added.

Early World War II production BAR belts were made of khaki material but this was changed to darker olive drab green later in the war. World War II BAR belts are easy to identify because the date of production is usually marked inside.

Sling

The BAR sling as originally issued in World War I was similar to the standard M1907 leather service rifle sling except that it was slightly longer and had three adjustment claws instead of two. This allowed for the weapon to be carried over the shoulder in the previously mentioned marching fire mode. The World War I belts were marked with the date of production, with "1918" being by far the most commonly encountered date.

This type of sling remained standard issue for the BAR and was placed back into production at the beginning of World War II. These slings were identical to the earlier variety except for the substitution of steel hardware for the earlier brass hardware. Later in World War II, a much simpler and cheaper to produce canvas web sling was adopted for the BAR. This sling saw use in the latter part of the war and remained standard post-WWII issue. BAR slings are still available today, and nice examples shouldn't be too hard for a collector to find.

Other BAR accessories include field manuals, technical manuals, cleaning items and carrying cases. All such related items are interesting additions to a collection.

While many people do not think of a Browning Automatic Rifle as a collector's item, nothing could be further from the truth. The weapon's historical association in at least three wars, its superb craftsmanship and impressive appearance all combine to make the Browning Automatic Rifle a great "collector's item" in every sense of the term.

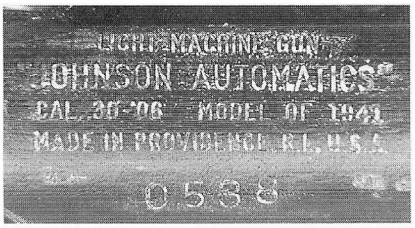
M1941 JOHNSON LMG

While not rare, the M1941 Johnson LMG is decidedly less common on the collector market today than any military issue version of the M1918 or M1918A2 BAR. Identifying an example is very easy due to its unique appearance. Unlike BARs and many other American military weapons, few, if any, Johnsons were arsenal overhauled. While a collector has to be careful when purchasing a BAR to be certain that the barrel, stock and other parts are correct for the vintage of the piece, someone looking at a Johnson LMG has a much easier task. The barrels were not dated, so if one matches the general condition of the rest of the weapon, its originality cannot be ruled out. It is possible that a gun has been reparkerized, so the markings should be examined. Otherwise, the general condition of the gun should be scrutinized and, otherwise, there are few other things to evaluate.

Not enough Johnson LMGs are around to justify someone making either fake or reproduction parts, but the possibility always exists. The bipod should probably be looked at closely as it is feasible that reproductions will turn up to replace those missing on some guns today. Few demilled Johnsons are known, so the likelihood of encountering one with a welded receiver is small.

It is possible, however, that a DEWAT (discussed in the section on Class III and Destructive Device Weapons) Johnson could have been restored to operating condition. Such "rewatted" weapons are less desirable than original, unmodified guns.

The M1941 Johnson LMGs were serially numbered in sequential order rather than in 10,000 number blocks with a letter prefix, as was the case with the M1941 Johnson rifles.



M1941 Johnson LMG receiver markings, including serial number.
(Hayes Otoupalik Collection)

Most of the M1941 Johnson LMGs on the market are the ex-Dutch weapons. However, the Marine and First Special Service Force Johnson LMGs are not believed to have been marked in any special way, so it is not possible to specifically conclude if a particular gun was or was not issued during World War II.

M1941 Johnson LMGs will be found in conditions ranging from like new to well-used. Obviously, the better condition guns are more desirable and will bring a higher price. Guns with missing bipods are less valuable than those with their bipods intact.

Accessories

There are few Johnson LMG accessories. The most common are the 20-round magazines. These are still around today in fair numbers at relatively reasonable prices. They are, however, harder to find and several times more expensive than BAR magazines. As stated, no magazine pouches or belts were procured.

The standard leather M1907 sling was often used with the Johnson LMG. A special canvas web sling much wider than the M1907 sling also saw some use with the Johnson LMG. These slings are rarely seen today.

Like the Johnson rifle, the M1941 Johnson LMG is a very pleasant weapon to shoot, particularly in the semiautomatic mode. Unless a gun is in pristine condition, occasional firing will not hurt its collector value.

While the M1941 Johnson LMG was never used in anywhere near the numbers of the famed BAR, it represents an automatic rifle design which had many very valuable and innovative features. The story of the American automatic rifle of World War II is not complete without including the M1941 Johnson. Like its semiautomatic rifle counterpart, its story is long overdue to be told.

Machine Guns

The weapons discussed previously have all been essentially individual weapons carried and used by one man. The BAR and Johnson automatic rifles were capable of providing fully automatic fire support for the infantry but were not designed for, or capable of, sustained heavy volumes of firepower. That role fell to the machine gun. Machine guns are generally divided into two groups: light and heavy. But, as we will see, there is some overlap between the two groups. Also, the roles in which the various types of machine guns were employed varied. Some were used as close fire support for advancing infantry while other machine guns were utilized almost solely as defensive weapons in fixed positions. Both light and heavy machine guns saw extensive use in all theaters of World War II and were indispensable weapons.

.30 Caliber Machine Guns

Although the manually operated, multi-barrel Gatling gun had been around since the Civil War, the first true machine gun in United States service was adopted by the U.S. Navy in 1896. This gas operated weapon, chambered for the 6mm Navy cartridge, was invented by John M. Browning and manufactured by the Colt Patent Firearms Manufacturing Company. Its unusual gas lever that operated in a vertical arc below the receiver gave the gun its common nickname, the "potato digger." A couple of these guns saw service during the Boxer Rebellion siege in Peking in 1900. After the turn of the century, the U.S. Army acquired a number of these machine guns chambered for the .30-40 Krag and, later, for the new .30-06 cartridge.

The Army did not officially adopt the Colt "potato digger" but eventually standardized a machine gun designed by Hiram Maxim that had been adopted by several European nations. The U.S. Army adopted the Maxim machine gun chambered for our standard .30 caliber cartridge as the Model 1904. However, given the lack of a perceived need for the weapon and shortage of funding, only a few guns were procured. The first American Maxim guns were acquired from the British firm of Vickers. Colt later produced a number of M1904 machine guns for the United States Army, but the total number delivered was fewer than 300 guns.

As we discussed previously, the onset of America's entry into World War I found our armed forces woefully short of all types of machine guns. The M1909 Benet-Mercie machine rifle and the handful of M1904 Maxim machine guns were supplemented by several hundred Lewis light machine guns and a few .30 caliber Colt "potato digger" guns. The standard British Vickers heavy machine gun had previously been adopted by the U.S. Army in 1915, and Colt eventually produced just over 12,000 of these guns in .30-06 caliber. However, the initial need for machine guns far outpaced production, and several thousand heavy and light machine guns were purchased from our French allies for issue to early contingents of the AEF.

.30 Caliber Water-Cooled Machine Gun

As was the case with his Browning Automatic Rifle, John M. Browning recognized the need for a truly modern American machine gun. Around 1901, Browning had done some preliminary work on a recoil operated machine gun but the weapon was never fully

developed. Browning went to work refining the design and the Ordnance Department tested the revised weapon in 1917 and found it to be an outstanding design. Chambered for the .30-06 cartridge, it was adopted as the Model of 1917 and ordered into production as soon as possible. The Model 1917 was mounted on a tripod and utilized the typical water-cooled operation of the Maxim, Vickers and other heavy machine guns of the era. Three firms, Remington, Colt and New England Westinghouse, produced a total of 68,389 Model 1917 machine guns during World War I, although only 30,582 were shipped to France before the Armistice. In addition to the infantry weapons, 580 air-cooled aircraft machine guns were made by Marlin-Rockwell during World War I.

With the end of the war, the War Department evaluated the Browning Model 1917 machine gun. The results of the evaluation revealed that the weapon functioned in an excellent manner, and the only serious weakness noted was the tendency of the receiver bottom plate to crack. This weakness was due to the utilization of an unsatisfactory grade of steel. Some 25,000 Model 1917 machine guns placed into storage during 1920 and 1921 were modified by having a metal reinforcement stirrup added to the receiver bottom plate. This was, admittedly, an interim measure until a more permanent solution could be devised.

After World War I, the Army looked for ways to expand the role of the heavy machine gun beyond its employment in the trenches of France, essentially as a lead sprayer. Given the weapon's steadiness in firing from the heavy tripod and by using optical artillery ranging instruments, targets not visible to the gunner could theoretically be accurately engaged. This indirect fire was very much in vogue by the U.S. Army establishment between the wars and it was even proposed that machine guns employed in such roles could replace light artillery. The mathematical equations necessary to properly calculate indirect firing were beyond the capabilities of most Army personnel, which obviously limited any effectiveness the practice may have had. Regardless of this fact, the emphasis during much of the 1920s and 1930s was on the heavy .30 caliber machine gun's indirect fire capability. Fortunately for our troops, such theoretical ideas did not have to be tested in combat during this period.

M1917A1 Machine Gun

By the late 1930s, a number of improvements in the original Model 1917 were instituted to correct some of the deficiencies found in the original design. The Rock Island Arsenal started a remanufacturing program in late 1936 and early 1937 to improve the M1917 machine gun. These changes resulted in the weapon being re-designated as the M1917A1 since the War Department by this time had replaced the "Model" designation with "M". Rock Island performed modifications to convert the M1917 machine guns into M1917A1 configuration.

(1) A newly manufactured bottom receiver plate was fitted.

(2) The rear sight was graduated for both the M1906 and the M1 ball cartridges.

(3) An improved cover latch assembly was added.

(4) An improved belt-feed lever was installed.

(5) The cover catch assembly was modified to hold the cover in a fixed position when opened.

(6) The Model 1917 tripods were slightly modified to M1917A1 configuration for improved adjustment capability.

Practically all of the nearly 70,000 WWI-vintage M1917 machine guns were thus altered to M1917A1 specifications. Rock Island completed the M1917/M1917A1 remanufacturing program before America's entry into World War II, and the M1917A1 was firmly established as the standard battalion level .30 caliber heavy machine gun in United States service. Some of the newly modified M1917A1 machine guns were sent to England and France under Lend-Lease terms to supplement these nations' heavy machine guns.

When America entered World War II, the demand for the M1917A1s naturally increased rapidly. Early in the war, contracts were given to several firms for new production M1917A1 machine guns. While these WWII-produced M1917A1 machine guns were very similar to the M1917-RIA modified guns, there were some manufacturing changes instituted. These World War II guns will evidence changes from the pre-war guns.

(1) The rear sight leaf was graduated for the standard M2 ball cartridge.

(2) The bronze end caps were replaced by steel end caps in order to conserve supply of bronze.

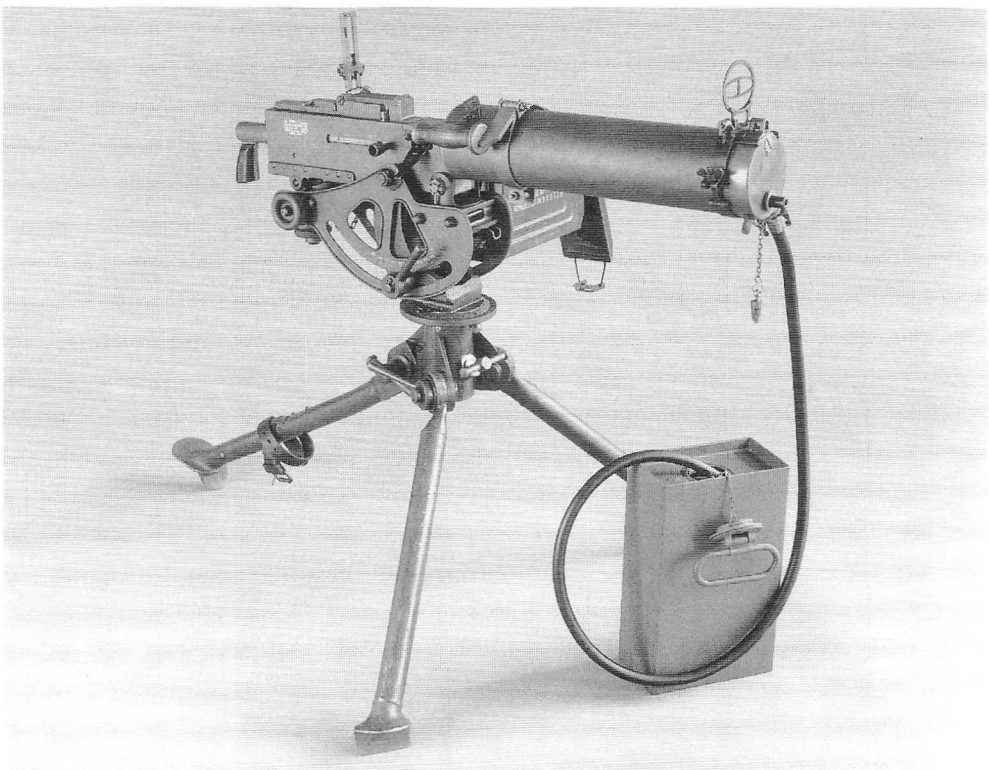
(3) An improved bolt was adopted that did not require as frequent replacement as the earlier guns.

(4) The bronze trunnion block was replaced by one made from steel.

(5) The steam tube assembly was improved to increase its reliability.

(6) The barrel gland unit was made of a non-corrosive material to increase its durability and decrease maintenance time.

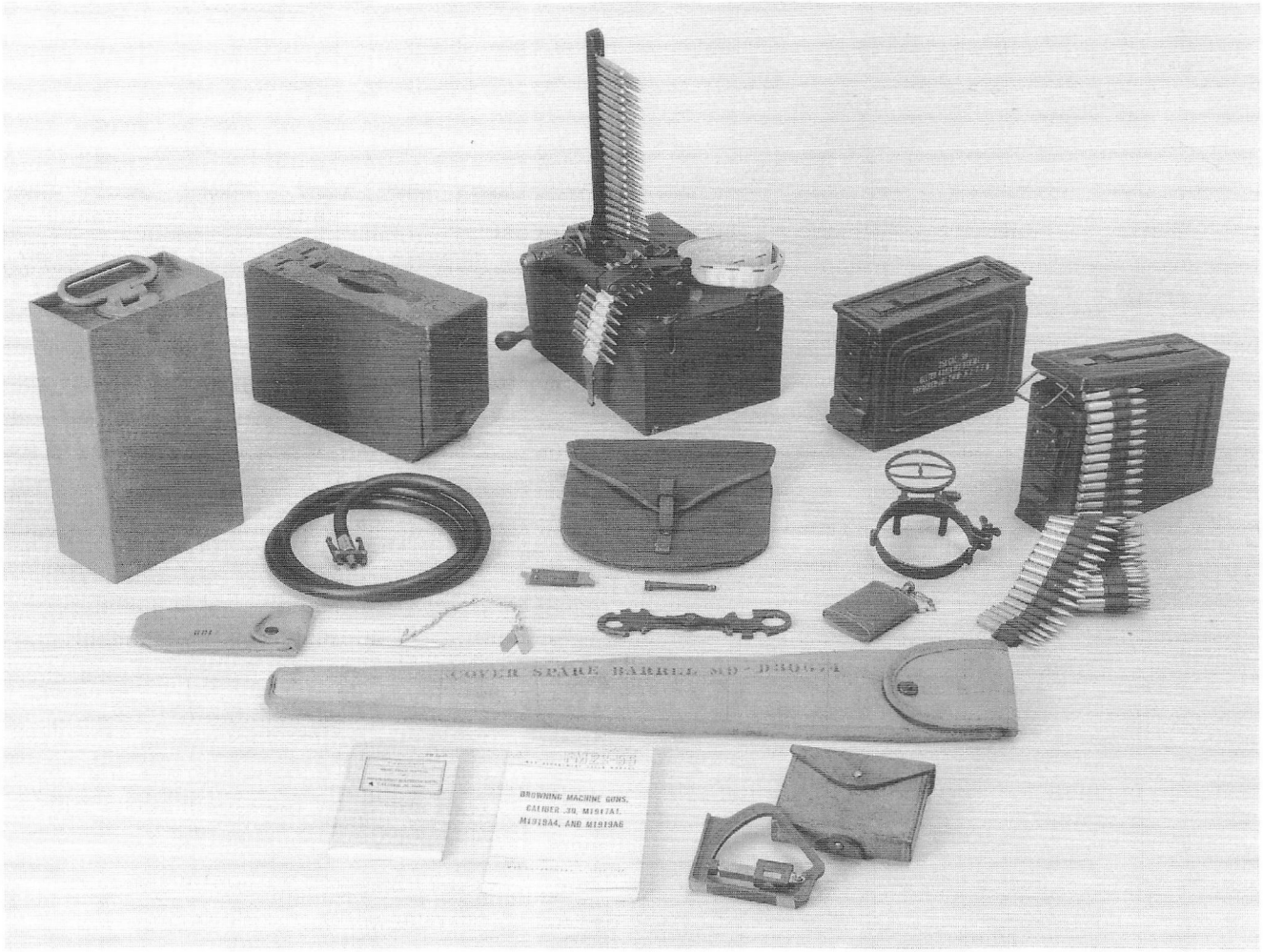
As can be seen, most of the manufacturing changes instituted during World War II were done either to conserve strategic materials or to increase the durability of the gun. However, John Browning's basic



Two photos of an M1917A1 .30 cal. water-cooled machine gun. The upper view shows the receiver area and the pistol grip and trigger. The cradle assembly with the traverse and elevation (T&E) mechanism is clearly visible. (Robert G. Segel Collection)

(left) Left side view of M1917A1 showing the ammo box. Note the water condensing can and the method of attachment of the water hose to the barrel jacket. Water circulating between the barrel and water jacket cooled the barrel and permitted a high rate of sustained fire.
(Robert G. Segel Collection)

(below) M1917A1 in fixed defensive position.
(U.S. Army)



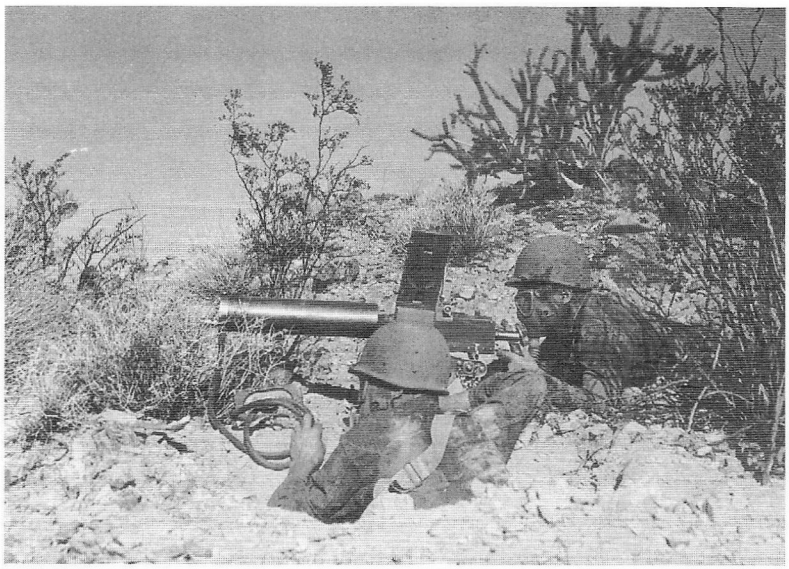
M1917A1 machine gun accessories. (left to right from top) Water condensing can, early wooden ammo box, belt filling machine, later metal ammo cans with belt of .30 cal. ammo. Other accessories include water hose, combination tool, oil can, detachable front sight, ruptured case extractor, headspace & timing gauge, spare bolt carrying case, M9 spare barrel cover, M1917 clinometer with leather carrying case and WWII field manuals. (Robert G. Segel Collection)

design remained remarkably unchanged throughout the weapon's service life.

The M1917A1 .30 caliber water-cooled machine gun was designated as a heavy machine gun for good reason. The gun itself (with water) weighed approximately 41 pounds, while the M1917A1 tripod weighed another 52.15 pounds. As can be seen, with a combined weight of gun and tripod in excess of 93 pounds before water cans, ammunition boxes and other accessories are counted, the M1917A1 was indeed a heavy and cumbersome weapon. The typical method of ammunition feed during most of World War II was by means of a 250-round fabric belt. Late in the war a disintegrating link belt was introduced that was retained for post-war use. The M1917A1 fired at the rate of approximately 450-600 rounds per minute.

Despite its bulk and weight, the M1917A1 machine gun was widely used in all theaters of the war, and its performance in its intended role was outstanding. It proved to be one of the most reliable weapons of its type ever fielded.

The gun's sustained fire capability was impressive due to its water-cooled system and belt fed mechanism. A condenser box was used to prevent steam from the gun giving away its position to the enemy. Mounted on the standard M1917/M1917A1 tripod, the gun could be counted on to deliver steady bursts of sustained fire. It was the workhorse of the heavy weapons platoon in both Army and Marine Corps service during the war. However, due to the heavy weight of the M1917A1 machine gun and its tripod, use of the weapon was restricted primarily to fixed positions. This prevented it from being easily deployed forward to support rapidly moving infantry assaults. The weapon's weight was often a greater handicap in the typically rugged terrain of the Pacific than in much of



(top) M1917A1 .30 cal. water-cooled machine gun. The soldiers are shown during training exercises as evidenced by the gas masks. (U.S. Army)
(bottom) .30 cal. water-cooled machine gun mounted on an M3A1 scout car. Such employment greatly increased the weapon's mobility. This photo was taken during the extensive maneuvers just prior to World War II. Note the horse cavalry behind the scout car and the motorcycle secured to the rear of the vehicle. (U.S. Army)

the European theater, where vehicular mobility was often more readily available (with such notable exceptions as much of the Italian campaign). As Col. John George pointed out regarding the .30 caliber water-cooled machine gun's use in the Pacific,

...on Guadalcanal the Heavy machine gun did not enjoy wide employment; it was used mostly in defensive roles and generally in positions not too far up the mountains. The M1917 Browning HMG...was much too heavy to be worth its salt.

Although the pre-war emphasis was on such exotic roles as indirect fire on targets some 4,000 yards away, the M1917A1's actual use in World War II was more typically in fixed positions secured by sandbags and registered on targets a few hundred yards (or less) distant. The U.S. Army and Marine Corps machine gun school instructors of the 1920s and 1930s, enamored by the indirect fire theories, would have felt using the gun in such an application was something akin to heresy, but it actually proved to be the M1917A1's forte. As related in the book *Shots Fired in Anger,*

So the full theoretical value of the heavy Browning was not utilized on Guadalcanal. It was not even used in its proper role as a medium and long range striker, much less as a long range, indirectly laid, flat-trajectory weapon. The jungle terrain would not often permit these uses. However, the gun did fine yeoman service as a defensive firepower weapon, either for fixed final protective fire or for spraying. In the earlier perimeter battles, for instance, it was the mainstay of a battalion line that held tight and killed more than 900 Japanese with negligible loss to themselves. Marines used the Heavies all along with good effect.

While the European theater may have been conducive to employing the heavy machine gun in more traditional roles, its actual use essentially paralleled that in the Pacific. Col. George gives a succinct summation of the M1917A1 role in the war when he stated that

For us...the Heavy was never more than a static defense weapon—a grand gun with which to stop a Banzai charge.

A comparison of the authorized levels of various types of weapons by World War II Marine Divisions from 1942 to 1945 ("D" through "G" series) reveals a marked decrease in the number of M1917A1 machine guns. In 1942, the authorized number of these weapons for a division was 544. This was reduced to 108 guns for 1943, and this figure was increased slightly to 162 for 1944 and 1945. The authorized allowance for a standard U.S. Army infantry regiment during World War II was 24 heavy .30 caliber machine guns, while an Armored infantry regiment was allowed 37 M1917A1s.

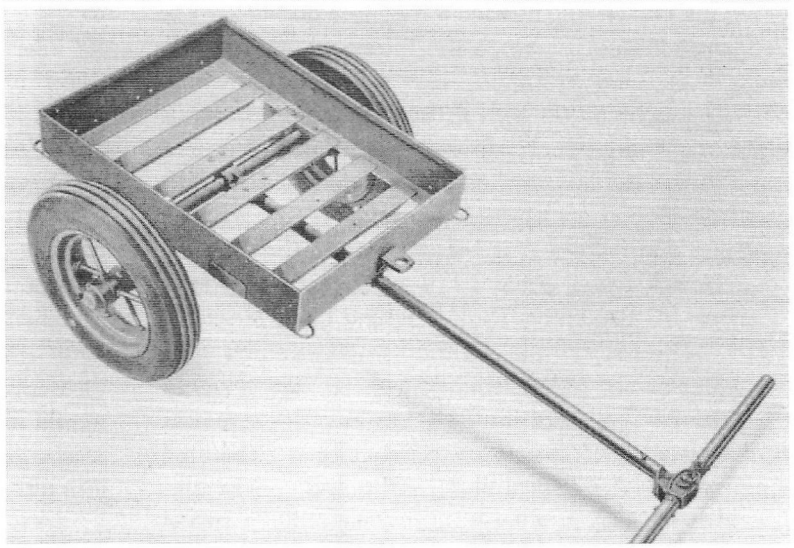
Ordnance Department records reveal that 53,859 M1917A1 machine guns were manufactured during World War II. Table #36 gives the number of

M1917A1 machine guns produced annually from 1942 through 1945.

Even though it was supplanted in many instances by the lighter air-cooled .30 caliber machine gun, the M1917A1 remained in use throughout the war in the machine gun platoons of the heavy weapons companies. When firing from a prepared position by a trained crew and with adequate ammunition supplies, the M1917A1 machine gun was an extremely deadly weapon for defensive use.

A little-known ancillary item used with the M1917A1 machine gun was the weapons cart. There were several variants of these small carts that were designed to carry machine guns and ammunition where motor vehicles were either not available or couldn't operate due to rugged terrain. The M4 and M4A1 Hand Carts (the M4 had motorcycle-type wheels while the M4A1 had cast aluminum wheels) were equipped with three brackets into which the legs of the M1917A1 tripod could be attached. So mounted, the machine gun could be more easily transported and put into action faster than if the weapon was hand carried. These carts were generally used to transport the heavy machine guns by hand but could be towed behind jeeps and other vehicles if the speed did not exceed 10 or 15 miles per hour. The hand carts were widely used stateside for training purposes. Overseas, they saw use in North Africa, Sicily and Italy, due to the rugged terrain encountered there, and also saw service in the Pacific. The hand carts were not often used in France or Northern Europe because the terrain usually allowed the use of jeeps, trucks and other vehicles. As Konrad Schreier, Jr. noted "....these carts are one of the forgotten bits of WWII infantry equipment associated with light weapons..."

The M1917A1 machine gun remained in use after World War II and saw service in Korea, where it excelled once again in stopping many of the mass attacks by the Red Chinese troops. The M1917A1 was placed back into limited production during the early 1950s to replace some of the guns lost in Korea and for foreign aid requirements. By the mid-1950s, the con-



(top) Early WWII photo of U.S. troops firing an M1917A1 machine gun during winter training exercises. Note the empty cloth ammo belt extending from the right side of the receiver. (U.S. Army) **(center) An M1917A1 mounted on the front of an M3A1 scout car.** (U.S. Army) **(bottom) M4A1 Hand Cart. Such carts were used to carry heavy machine guns, ammunition of all kinds and other items such as extra flame thrower tanks.** (TM 9-2200)

cept of a heavy water-cooled machine gun was out of vogue. The gun's weight and the problems encountered in certain regions of the world with maintaining an adequate water supply damned the weapon in the eyes of modern military thinkers. Metallurgical improvements and design innovations gave air-cooled machine guns greater sustained fire capability that even further limited the M1917A1's appeal. Many thousands of these weapons were given away under various military assistance programs to a number of present and erstwhile allies around the globe. It may even be found in limited service today in some of the less developed nations.

Although conceived as a deadly weapon for trench warfare in the First World War, the M1917A1 .30 caliber water-cooled machine gun proved to be one of the best weapons of its type during World War II. While its bulky water-cooling system and heavy tripod limited the gun's mobility, these features also gave the weapon its excellent sustained firepower capability. A soldier couldn't sling the water-cooled Browning and tripod over his shoulder and go charging off into the sunset. However, if a soldier or Marine was faced with the unpleasant task of stopping a massed infantry charge, there was probably no better weapon available than the M1917A1 machine gun.

.30 Caliber Air-Cooled Machine Gun

In addition to the water-cooled M1917A1 machine gun, the United States fielded several air-cooled .30 caliber machine guns during World War II. These air-cooled variants had their roots in the First World War, when the U.S. Army needed a machine gun to arm its fledgling tank corps. Since the interior of these early tanks was very cramped, the standard Browning M1917 machine gun with its water-cooled apparatus was not suited for such use. In order to meet the need for a tank machine gun, the U.S. Ordnance Department developed an air-cooled version of the M1917 machine gun. World War I ended before the weapon could be fully tested but in 1919 the Army adopted the "Caliber .30 Browning Tank Machine Gun, Model of 1919." The M1919 utilized the same basic action as the water-cooled M1917 but had an 18" barrel rather than the 24" barrel of the M1917. In order to aid in cooling the barrel, it was surrounded by a perforated metal jacket. An optical sight and a ball mount was provided for use in a tank, and a lightweight tripod was developed so the gun could be dismounted and used as a ground weapon.

The U.S. Army procured 2,586 M1919 tank machine guns that were converted from existing M1917 guns. The weapon continued in service as the Army's tank machine gun until well into the 1930s. It is interesting to note that none of these weapons saw combat and most were eventually converted back into their original M1917 water-cooled configuration prior to World War II.

Even though the M1919's initial role with the infantry was secondary to its role as a tank weapon, the gun's usefulness as a ground support weapon was obvious. By the early 1920s, a number of M1919 tank machine guns were modified for infantry use by eliminating the ball mount and substituting a more durable fixed tube sight for the optical tank sight. The tripod developed for the M1919 tank machine gun was retained. It took almost a decade, but in 1931 the modified weapon was officially adopted as the M1919A1.

Since the M1919A1 was essentially a makeshift design, extended use pointed out some problems regarding the gun's sights, barrel and tripod. Nevertheless, the M1919A1 validated the concept of a relatively lightweight .30 caliber air-cooled machine gun for infantry use. A slightly improved variant, the M1919A2 was adopted for cavalry use in the late 1920s but the weapon was still not totally acceptable to the Army. Like the M1919 and M1919A1, the M1919A2 was produced by converting M1917 water-cooled machine guns. The precise quantity converted, though rather small, is not known. It has been reported that a small number of the M1919A2 guns were used in the Philippines in the opening days of World War II.

By the late 1920s, the Army was firmly committed to the idea of an air-cooled .30 caliber machine gun for infantry use, and an evaluation was done to determine what improvements were needed on the M1919A1 and M1919A2 machine guns. The M1919A3 was developed to test the modifications recommended to improve the earlier guns. The Infantry Board ordered 72 M1919A3 machine guns for extensive testing and evaluation. This testing pointed out some weaknesses in the M1919A3, and a modified version of the weapon was developed in the early 1930s. This weapon incorporated the best features of the earlier guns and added other improvements. New sights were fitted, and the barrel length was changed from 18" to 24". An improved tripod was also developed for the weapon.

M1919A4 .30 Caliber Air-Cooled Machine Gun

By the mid-1930s, the Ordnance Department was satisfied with the refined design and the weapon was officially adopted as the M1919A4. The M1919A4

The M1919A4 .30 Caliber Air-Cooled Light Machine Gun. (Hayes Otoupalik)

was a welcome addition to the infantry's arsenal as it filled a void that had existed for a number of years. The Infantry Board enthusiastically endorsed the M1919A4 light machine gun, and some officers wished to totally replace the water-cooled M1917A1 with the weapon. As discussed previously, the M1917A1's weight and bulk made it a cumbersome weapon in many applications, and it was felt by some that the air-cooled light machine gun could satisfactorily perform its role. This can be (and was) debated as the water-cooled heavy machine gun's performance as a defensive weapon operating from fixed emplacements was indeed impressive. On the other hand, a machine gun back at the battalion perimeter was of little use to a rapidly advancing rifle company several miles ahead of the front lines. Therefore, in the years just prior to America's entrance in the Second World War, both the water-cooled M1917A1 and the air-cooled M1919A4 machine guns were in the infantry's inventory and both were to play important roles in the war.

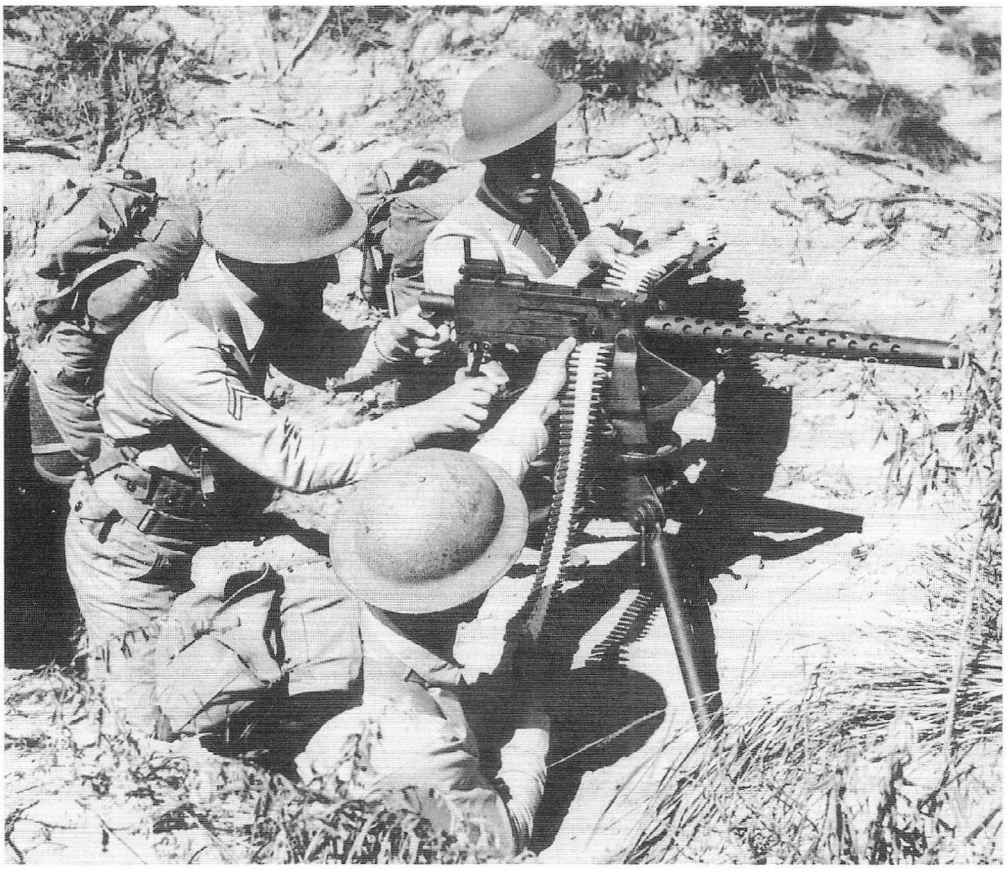
Even though the M1919A4 was adopted in the mid-1930's, production was extremely limited. The Rock Island Arsenal turned out a few of the weapons on an almost hand-made basis during the period, but this limited production was enough to meet the low demands during this time. By the late 1930s, the War Department recognized the need to explore potential production sources of machine guns. In April of 1938, the Saginaw Steering Gear Division of General Motors was given a contract to do engineering studies for machine gun production.

By the time America entered World War II, a number of commercial firms were geared up for production of the Browning machine guns and they began to

The air-cooled 'A4 was much lighter and more portable than its M1917A1 water-cooled counterpart. (U.S. Army)

come off the assembly lines in large numbers. A total of 389,251 M1919A4 machine guns were manufactured during World War II with Saginaw producing the largest number. Table #36 gives the annual totals of production during World War II for the M1919A4.

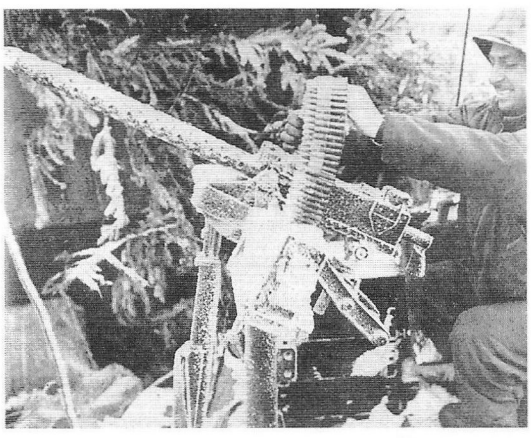
The M1919A4 was used with the M2 tripod for infantry use. Other than lacking the water-cooling apparatus of the M1917A1, the two weapons were very similar. The M1919A4 used a heavier barrel than the water-cooled gun and had a ventilated metal jacket to assist in cooling. Both the gun and its tripod were



(left) An early World War II photo of an M1919A4 machine gun crew. (U.S. Army)

(right) 2nd Armored crewman of an M4 Sherman tank cleaning a .30 cal. air-cooled machine gun. This gun was inserted into the ball mount on the front of the tank. Such use illustrates the versatility of this weapon. (U.S. Army)

(below) A soldier loading his M1919A4 machine gun, winter, 1944-45, ETO. The M1919A4 was a reliable weapon even under adverse weather conditions such as this. (Konrad F. Schreier, Jr.)



much lighter than their water-cooled counterparts. The M1919A4 machine gun weighed 31 pounds (compared to the M1917A1's weight of 41 pounds) and the M2 tripod weighed a mere 14 pounds, as opposed to the M1917A1 tripod that weighed in at a whopping 52.15 pounds. The gun fired at a slightly lower rate of 400-550 rounds per minute. It fed from the same type of 250-round fabric belt and, later, the metal disintegrating link belt. Obviously, a gun and tripod weighing about 45 pounds was much easier to move and set up than a machine gun and tripod weighing over 90 pounds. While the M1919A4 was not as steady while firing as the M1917A1 and was not capable of delivering as much sustained firepower, its better concealability and ability to be easily transported and brought into action quickly was more than a trade-off to many infantry commanders. A World War II Marine Corps report states that "...the light machine gun was particularly favored because of its rapid rate of fire, mobility and low silhouette." This feeling is echoed in the book *Shots Fired in Anger.*

Being handy and easy to carry, such guns could keep up with their companies or even large patrols. Although they could not be practicably fired during movement they could be quickly mounted for action, easily dug in (because of their low profile) and easily hand-carried while fully mounted... These guns were the first real firepower which a commander could rely upon during the early stages of a fight; the heavier guns....because of their weights, could seldom be counted on for sure until the second day or so.

The Marine Corps report of the weapons used on New Georgia Island by the Raiders contains this information about the light machine gun.

Browning Light Machine Gun, M1919A4. Experienced practically no stoppages, highly praised. Properly head-spaced, cleaned and cared for, the gun functions perfectly.

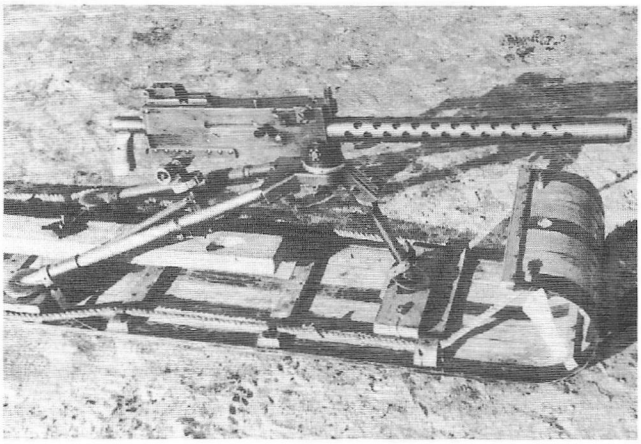
The M1919A4 was a very popular weapon with the majority of its users during World War II. The advantages of the gun over the M1917A1 outweighed the disadvantages, and the M1919A4 actually replaced the water-cooled machine gun in some combat units. The M1917A1 remained the mainstay of a battalion's heavy weapons company machine gun platoon, but for the basic infantry company, the air-cooled saw much wider use. As discussed, the M1919A4's mobility enabled it to keep up with rapidly moving troops, and the weapon provided firepower when the heavier machine guns were not available. Extensive testing by the Ordnance Department during World War II revealed that the water-cooled machine gun could indeed maintain continuous firepower for a prolonged period of time but that the M1919A4 was almost as effective for shorter sustained rates of fire.

The authorized allowances for the M1919A4 was always significantly higher than for the M1917A1. As an example, the "Comparison of Equipment, Marine Division" from 1942 to 1945 gave these allowances for the two machine guns.

	1942	1943	1944	1945
M1917A1 water-cooled	544	108	162	162
M1919A4 air-cooled	656	682	302	356

The greater distribution of the M1919A4 was due to the fact that the average rifle company of World War II had a weapons platoon consisting of a light machine gun section equipped primarily with the

Marines training with an M1919A4 .30 caliber machine gun fitted with a blank firing adapter on the muzzle.
(U.S. Marine Corps/courtesy of Konrad F. Schreier, Jr.)



(left) Experimental toboggan-mounted M1919A4 air-cooled machine gun. (U.S. Army) **(right) Unusual World War II photograph showing an M1919A4 light machine gun disassembled and carried on the back of a dog.** (U.S. Army)

M1919A4 machine gun and a 60mm mortar section. As discussed, the M1917A1 heavy machine gun was generally restricted to duty with a heavy weapons company at the battalion level.

The M1919A4's basic action was used on other .30 caliber air-cooled machine guns used in tanks and aircraft. It was actually one of the more versatile weapons of the war and served in many roles other than as the basic infantry light machine gun.

The M1919A4 saw wide use in all theaters of World War II. The weapon remained in the military's inventory after the war and saw action in Korea. Like the M1917A1, the M1919A4 was placed back into production after World War II in limited numbers. It was replaced in front line American military service by the all-purpose M60 machine gun. Many thousands were given away to various allies over the past 40 years or so, and the weapon still remains in use in some developing countries. A number of guns have been converted to the 7.62mm NATO cartridge, further extending its service life. For a weapon having its origins in the First World War, the M1919A4 light machine gun proved to be a remarkable weapon. It was truly a mainstay of the American infantry of WWII and was undoubtedly one of the most effective weapons of its type fielded during the war. While the water-cooled machine gun may have been capable of firing for longer periods of time and while the BAR may have been lighter and easier to carry, the M1919A4 filled the gap between these weapons. Few weapons of the war had such universal acceptance and provided better service to the infantryman.

M1919A6 Light Machine Gun

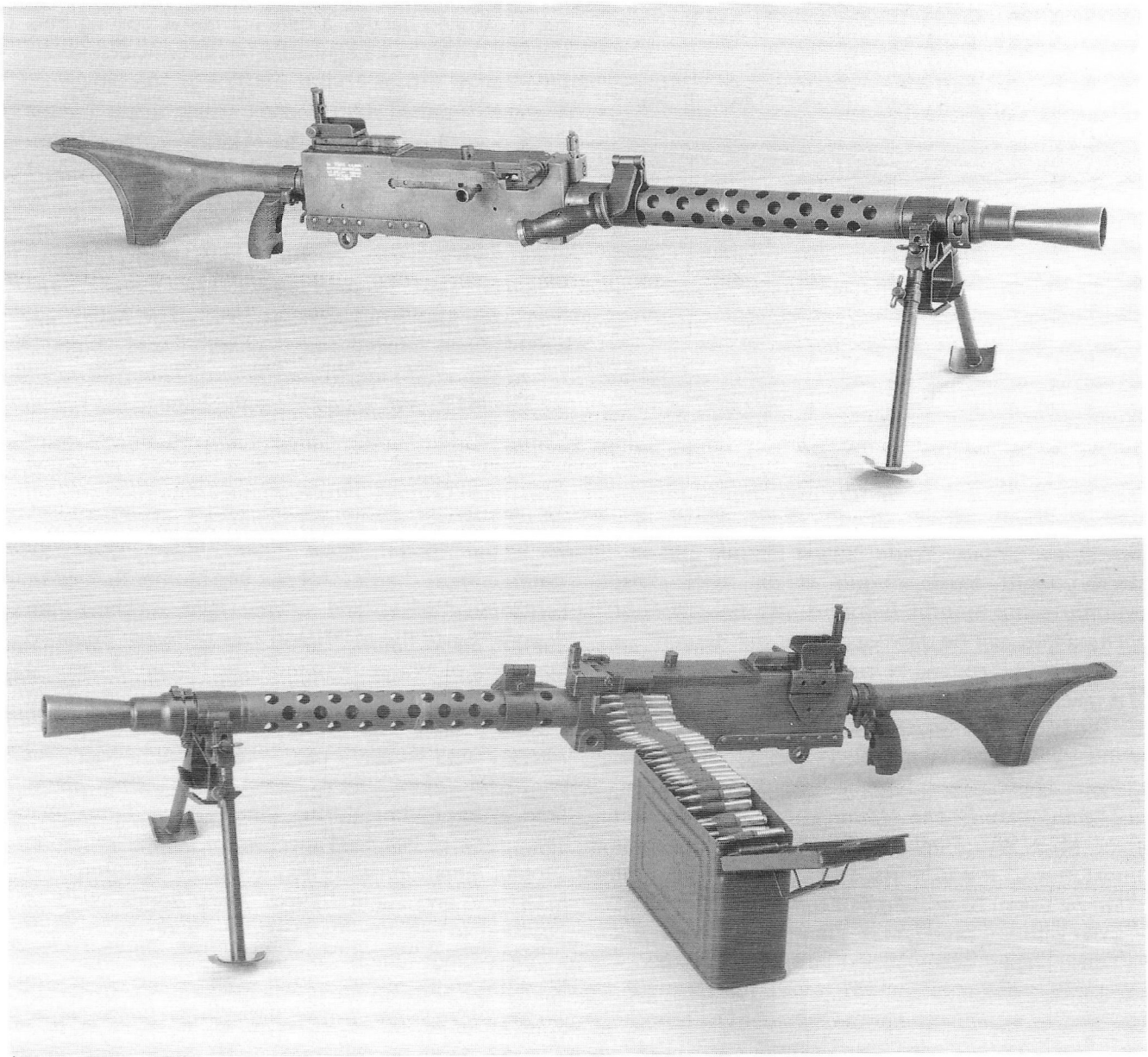
Even with the success of the M1919A4 air-cooled light machine gun, there remained a gap in infantry weaponry between this weapon and the BAR. This void was recognized prior to World War II. In 1940, the Ordnance Department issued a directive for the development of an air-cooled machine gun weighing 22 pounds or less and utilizing a belt-fed mechanism. Several domestic and foreign designs were evaluated in late 1941 and early 1942. While several of these weapons (such as the German MG 42 mentioned previously) showed some promise, none were adopted.

As more and more American troops were employed in combat zones, the need for a weapon that could provide more sustained firepower than an automatic rifle yet be more portable and easier to set up than the M1919A4 became increasingly obvious. A 1943 Marine Corps evaluation of the M1919A4 machine gun gave the weapon high marks but contained negative points.

Some weapons platoon leaders believe the gun (M1919A4) to be too slow in getting into action and the crew too vulnerable. It is suggested that a new mount for close in jungle fighting be designed, on the order of the bi-pod and butt-rest similar to the BAR M1918A2 with the addition of a carrying handle on the barrel jacket similar to the British Bren.

A number of Army and Marine troops also desired a modified version of the M1919A4 machine gun without a tripod and with lighter components to fill the void existing between the BAR and the M1919A4. The Ordnance Department wanted to develop a totally new type of weapon and rebuffed these requests with the pronouncement that "...it is believed that no advantage would accrue in recommending a modification of the M1919A4 machine gun at this time, as such modifications would meet the approved military characteristics of the light machine gun in part only."

The Infantry Board, on the other hand, was of the opinion that a modified M1919A4 may not be the



Two views of an M1919A6 .30 cal. light machine gun. This weapon was adapted from the Browning-designed M1919A4 .30 cal. air-cooled machine gun. The adaptation consisted chiefly of adding a buttstock, bipod, flash hider and lighter weight barrel to the basic M1919A4 in an attempt to combine the portability of the BAR with the firepower of the light machine gun. Like most compromise weapons, the M1919A6 did not fully live up to expectations. (Robert G. Segel Collection)

optimum weapon, but a compromise light machine gun in hand was better than a superior weapon still on the drawing board. This is made clear in an Infantry Board report that stated, "While these modifications do not constitute the ultimate in the development of a light machine gun, they do give a satisfactory gun in a minimum amount of time and manufacturing adjustment."

In this light, the Board responded to the Ordnance Department.

The Infantry Board favors a project by the Ordnance Department for the development of a light machine gun. However, based on past experience, the Board believes that the time consumed in the development, technical testing, production of pilot models, service testing, adoption as standard for issue, set up for manufacture and distribution to the services will be so great that under the best of conditions of accelerated procedure, it will be a distant date in the future before the weapon can be placed in the hands of troops. The modifications for the M1919A4, namely, a lighter barrel, no muzzle plug, a 041 spring, a bipod and a shoulder rest as recommended by the Infantry Board, should

Troops of the 101st Airborne Division, 1944-45. Note the trooper on the left with an M1919A6 machine gun. (U.S. Army)

present no great manufacturing difficulties, and after the items are manufactured, the modifications can be made in the field. If this is accomplished, the services could have a flexible and satisfactory light machine gun at an early date, certainly many months before a new type of light machine gun can be developed and distributed.

The requests coming in from infantry commanders for a machine gun lighter and easier to get into action than the M1919A4 spurred the Infantry Board to push for the adoption of the modified weapon. The following statement was issued by the Infantry Board.

The Infantry Board considers the modification of the M1919A4 Machine Gun a matter of major importance to the infantry and...recommends that action be taken to accomplish this modification...

Even with the prodding of the Infantry Board, the Ordnance Department was reluctant to officially adopt a modified version of the M1919A4 machine gun. However, as a compromise, an Ordnance Department committee recommended on September 23, 1942, that the components needed to convert the M1919A4 to the desired configuration be adopted as accessories for the M1919A4. Five M1919A4 machine guns were modified using the newly adopted accessories and tested at the Aberdeen Proving Ground.

The Ordnance Department eventually decided that formal adoption of the modified weapon would create fewer problems than attempting to convert existing M1919A4 machine guns. On February 17, 1943, the M1919A6 light machine gun was officially standardized. Further testing revealed a few relatively minor problems that were corrected in due course. The M1919A6 began to be issued in late 1943.

Noted arms historian Konrad Schreier, Jr., has called the M1919A6 "the most unique gun in the M1919 series." The M1919A6 featured a detachable shoulder stock, a folding bipod on the end of the barrel, a carrying handle, a different barrel bearing than the M1919A4 and a lighter barrel. Its basic action was identical to the air-cooled M1919A4 machine gun. The gun weighed 32.5 pounds, which made it some 12.5 pounds lighter than the M1919A4 mounted on the M2 tripod. A total of 43,479 M1919A6 light machine guns were produced during World War II by Saginaw. However, a number of M1919A4 machine guns were also converted into M1919A6 configuration. The M1919A6 machine guns were manufactured from very late 1943 through 1945. The M1919A6 machine gun could also be used with the M2 tripod if necessary.

The M1919A6 added some flexibility to the implementation of the light machine gun for combat units and was obviously easier to carry and get into action than the M1919A4. However, the weapon was not an unqualified success. It was not as steady in sustained fire as the tripod mounted M1919A4. It weighed substantially more than a BAR and was heavier than other comparable allied and enemy light machine gun designs. Since the M1919A4 was generally operated by a crew of two or more men, the burden of carrying the machine gun and its tripod was distributed among several people. The M1919A6 was carried by one man and was actually a couple of pounds heavier than the M1919A4 without its tripod. Since both weapons fired at approximately the same rate and used the same type of belt feed mechanism, the ammunition supply situation was about equal between the M1919A4 and the M1919A6. Many troops who had occasion to use the M1919A6 were of the opinion that it was not sufficiently lighter and handier than the M1919A4 to offset these deficiencies.

The M1919A6 shared the virtues and vices of most compromise weapons. It could be quickly procured and was based on a very reliable weapon. On the other hand, it was too heavy for its intended purpose and never fully met the expectations many had for the gun. As it turned out, both the Ordnance Department and the Infantry Board had valid reasons for their respective positions. The Ordnance Department knew that a modified M1919A4 wasn't going to be a totally satisfactory weapon for the reasons outlined. However, the Infantry Board pressed for a less than satisfactory weapon in the hands of the troops immediately, rather than wait for a better gun at some distant point down the road, if ever.

The M1919A6 was widely used in the latter stages of World War II and remained in use in the post-war military. The weapon saw service in Korea and Vietnam and some may still be encountered around the globe on a limited basis.

.50 Caliber Machine Guns

Without question, one of the most formidable and versatile infantry weapons of World War II was the Browning .50 caliber machine gun. The .50 caliber was used in a variety of roles, ranging from aircraft use to ground combat. Its effectiveness made it one of the most widely used weapons of the American military during the war.

The story of the .50 caliber machine gun, like the .30 caliber weapons we have discussed, has its genesis in the First World War. When the American Expeditionary Force (AEF), entered the combat zones in France, one of the weapons in the German arsenal that our troops did not possess was the 13.2mm antitank rifle. This massive bolt action weapon was developed by the Germans to counter the Allied tanks which were coming into service. The lightly armored tanks of the time were vulnerable to the large caliber, high velocity cartridge, and the weapon was used with some success.

Since the Germans were beginning to deploy tanks as well, the Americans needed a comparable weapon to counter this new threat. In April of 1918, the AEF urgently communicated to the War Department the need for such a weapon. It was felt that a machine gun firing a cartridge comparable to the German 13.2mm round would be much more effective than a single shot bolt action rifle. Such a machine gun would also be very valuable for aircraft use.

The task of developing the new cartridge was given to the Winchester Repeating Firearms Company. Ballistic testing confirmed that a .50 caliber cartridge would be the optimum size, which was comparable to the 13.2mm (approximately .53 caliber) German antitank round. The resulting cartridge had the appearance of a greatly scaled up .30-06 round. Preliminary testing of the original cartridge revealed some ballistic shortcomings, and additional development was needed to make it acceptable.

While Winchester was working out the problems with the .50 caliber cartridge, the Ordnance Department looked into the best type of machine gun for use with the new round. It should come as no surprise that John M. Browning was consulted on the problem. Browning stated that he could enlarge his basic Model 1917 recoil operated .30 caliber machine gun to fire the new .50 caliber cartridge. Working in conjunction with the Colt's Patent Firearms Manufacturing Company, Browning tackled the project and had a prototype gun ready for testing on November 12, 1918. However, this was the day after the Armistice so, obviously, none of the weapons saw service in the First World War.

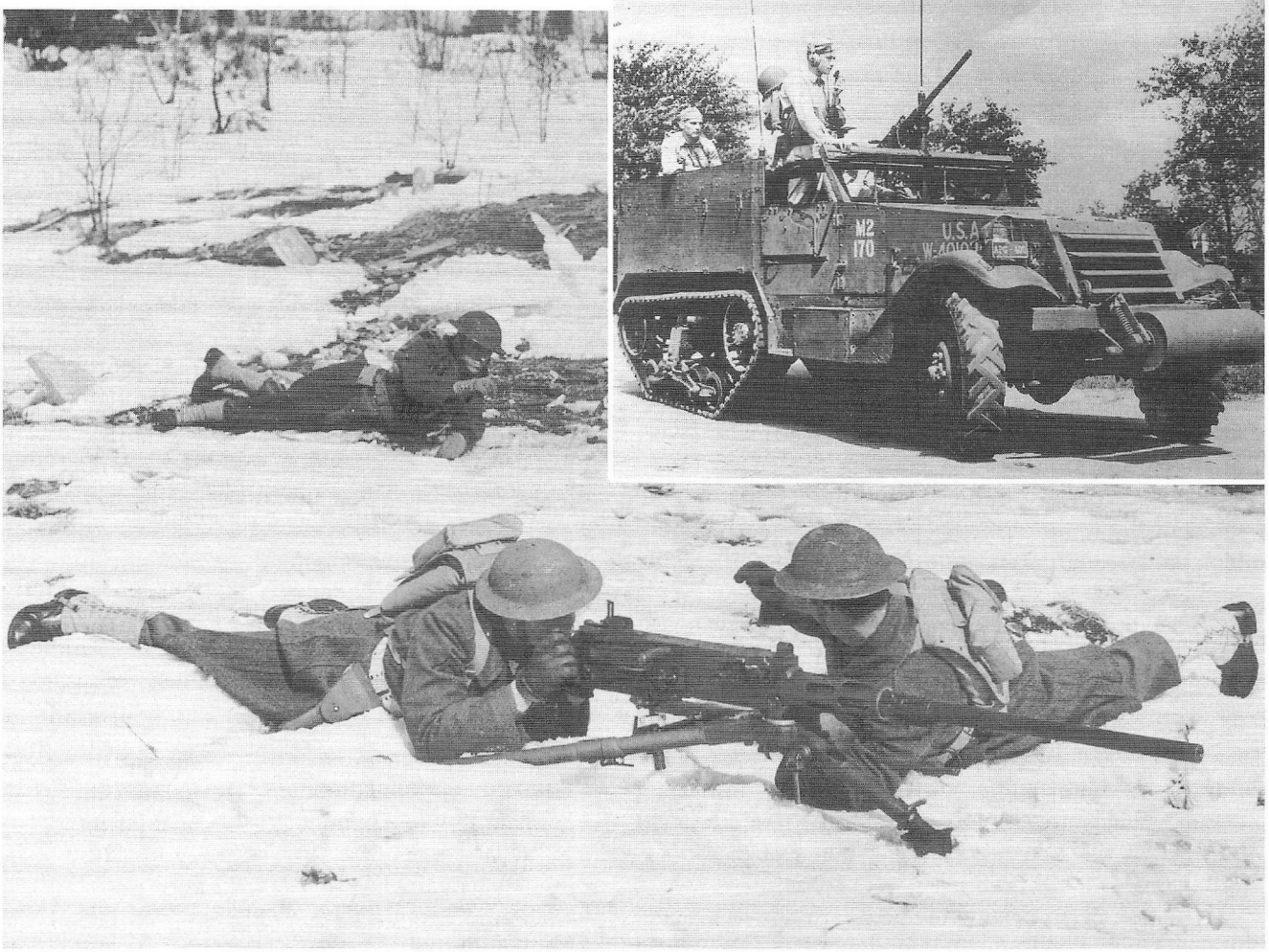
After the war, development continued on the new machine gun and the Frankford Arsenal took over the refinement of the .50 caliber cartridge. The revised round was significantly more powerful than the original Winchester design and met all of the requirements for the cartridge. It fired a massive 700 grain bullet at 2,800 feet per second which equalled or exceeded the performance of the German 13.2mm round. Unfortunately, the power of the revised .50 caliber round presented some problems including the fact that its recoil could shake Browning's basic machine gun mechanism apart. To counter this problem, Browning developed a hydraulic buffer which eliminated much of the recoil stress and also could be adjusted to control the rate of fire to some extent.

The refined machine gun and Frankford Arsenal .50 caliber cartridge combination saw extensive testing beginning in 1919 and continuing for a couple of years. This in-depth testing showed the excellence of the weapon and it was formally adopted as the Model 1921. The .50 caliber Model 1921 used the basic Browning recoil-operated machine gun design like the earlier .30 caliber guns (with the new buffer system) and utilized the basic type of water-cooling mechanism, such as the Model 1917 machine gun. Both the U.S. Army and the U.S. Navy adopted the M1921 machine gun, although none were procured for issue until 1925. Given lack of demand for such heavy weaponry during the 1920s and into the early 1930s, few of the .50 caliber machine guns were ordered. It has been recorded that only some 1,000 of the guns were delivered between 1925 and 1934, with the majority of them purchased between 1929 and 1933. Although developed as an antitank weapon, both the Army and the Navy utilized the water-cooled M1921 .50 caliber machine gun as an anti-aircraft weapon. The gun would have been awesomely effective on the fragile and slow airplanes of the day.

One problem encountered with the M1921 design was the charging (cocking) handle which proved to be rather difficult to manipulate. An improved handle design was developed in 1930 and the revised weapon was given the designation M1921A1. The new charging handle was retro-fitted to the guns manufactured previously.

(right) A WWII half-track mounting an air-cooled M2 .50 caliber machine gun. (U.S. Army)

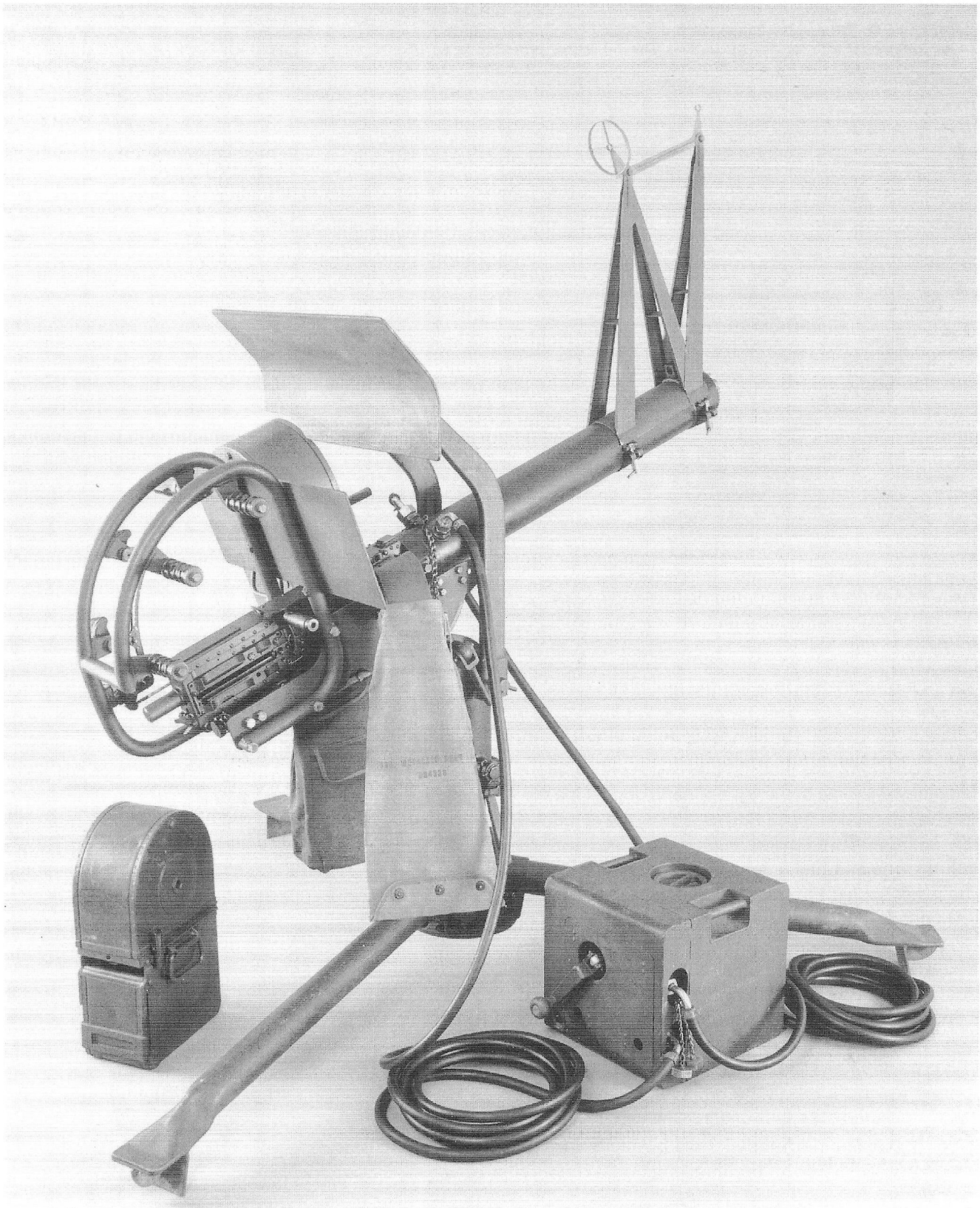
(below) U.S. soldiers training with an M2 .50 caliber machine gun during the early days of WWII. Note the soldier in the background directing fire. (U.S. Army)



M2 .50 Caliber Machine Gun

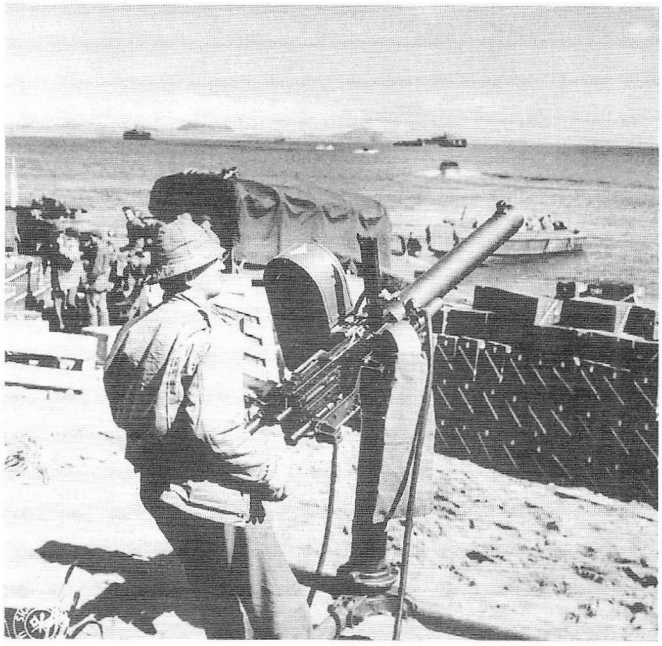
As the U.S. Army began to consider the eventual necessity of changing from the old horse cavalry to mechanized equipment, the type of armament for tanks and other vehicles was evaluated. Since the .50 caliber machine gun was the standard antitank weapon, it was natural that the gun would be selected for such use. However, to replace the heavy and bulky water-cooling mechanism of the M1921/M1921A1, an air-cooled version was introduced. The Ordnance Department had done some preliminary testing previously on an air-cooled variant of the M1921 machine gun and a satisfactory prototype gun was soon developed. In order to compensate for the lack of water cooling, a heavier 36" barrel was used on the gun. The weapon proved to be what the Army was looking for and was standardized as the "Caliber .50 Machine Gun, Heavy Barrel, M2."

In addition to use on motorized vehicles, a tripod was standardized as the M3 for ground use as an infantry weapon. In order to increase the performance of the .50 caliber cartridge, the length of the barrel was increased from its original length of 36" to 45" in 1938. A slight decrease in the cyclical rate of fire resulted from the greater weight of the longer barrel. The basic M2 HB (Heavy Barrel) .50 caliber machine gun weighed 81 pounds, and the M3 tripod added another 44 pounds. The .50 caliber Browning machine gun could feed from either the right or left side, which added to its versatility for aircraft use and other purposes, although the configuration of many of its mounts dictated feeding from the left side. The M2 machine gun had a rate of fire of approximately 450-550 rounds per minute and an effective range of 2,500 yards.



Browning M2 .50 caliber water-cooled machine gun (rear view). While this weapon's size and weight precludes it from being classified as an "infantry weapon," its effective use as an antiaircraft weapon illustrates its versatility. (Robert G. Segel Collection)

(left) Water-cooled version of the .50 caliber machine gun on an antiaircraft mount guarding supplies on a beach. Note the 200-round magazine on the left and the bag to catch the ejected links on the right. (U.S. Army) (right) A .50 caliber water-cooled machine gun in an antiaircraft mount with camouflage netting. The .50 caliber proved to be an effective weapon against low-flying aircraft. (U.S. Army)



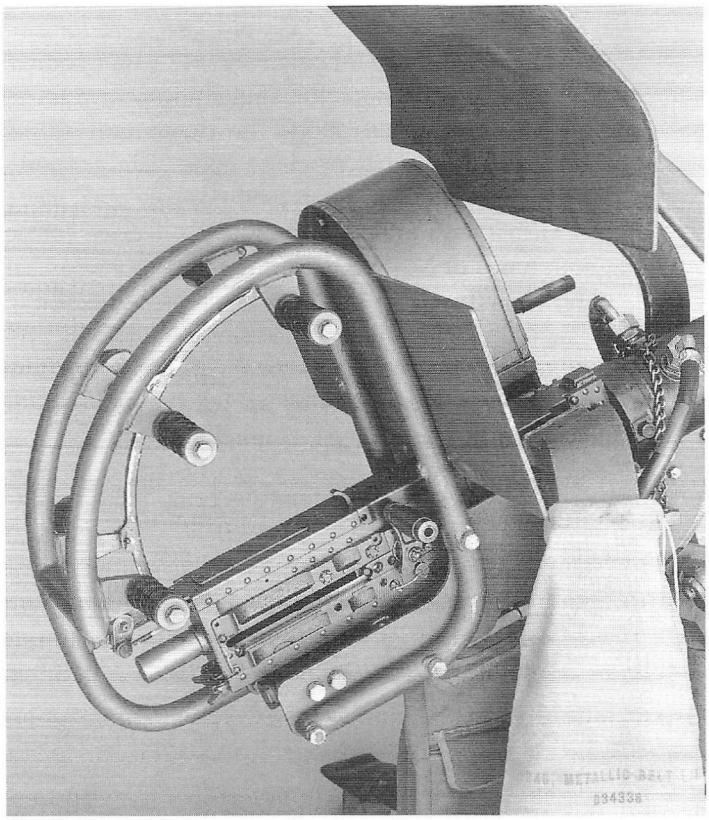
M2 .50 Caliber Water-Cooled Machine Gun

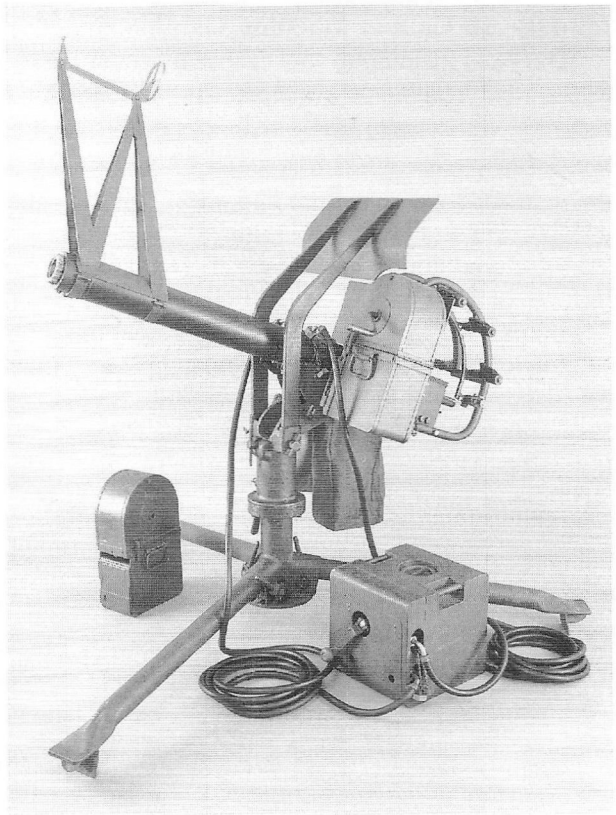
The water-cooling mechanism of the M1921/M1921A1 .50 caliber machine gun proved to be somewhat unreliable and in 1933 an improved design was standardized. The refined weapon was also given the M2 designation and was formally adopted as the "Caliber .50 Machine Gun, Water Cooled, M2." The water-cooled M2 was made in two basic configurations that differed mainly in the type of hand grips. One version had the spade-type grips used with the air-cooled M2, and the other version was used in fixed anti-aircraft mounts and had a remote side-mounted trigger. The water-cooled M2 machine gun weighed just over 100 pounds, and the water jacket with its 10 quarts of water added another 21 pounds. The weapon was used with a variety of mounts, one of the most common being the M3 anti-aircraft mount that weighed about 380 pounds. The "Water Chest, M3" was also used with the M2 machine gun and added another 74.5 pounds when filled. Due to the weapon's obvious size and weight, it cannot be properly classified as an infantry weapon and its employment was limited to anti-aircraft defense in fortified, fixed positions. In such roles, it was very effective because long bursts could be fired without danger of over-heating.

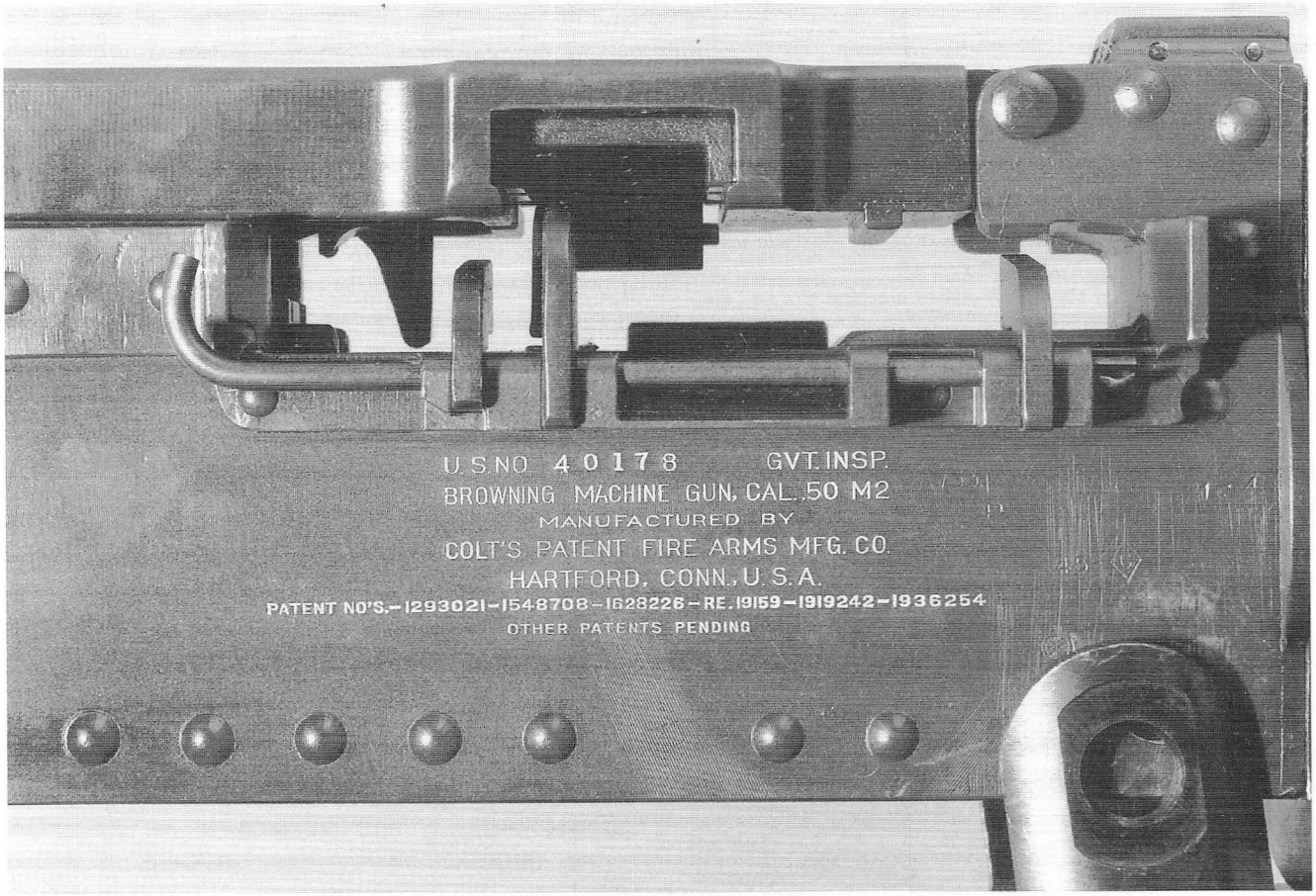
On the eve of World War II, the United States possessed what was undoubtedly the best large caliber machine gun in the world. Soon after our entry into the conflict, the value of the .50 caliber machine guns soon became apparent. The water-cooled anti-aircraft variant performed well and saw effective use throughout the war. Some 82,500 water-cooled M2 machine guns were reported to have been manufactured by Colt prior to the end of World War II. The authorized allowance for this weapon for a Marine Division in 1942 was 32 guns. Later Marine Corps Tables of Equipment do not list the water-cooled .50 caliber machine gun at all, and it was dropped from use altogether shortly after World War II.

M2 .50 caliber water-cooled machine gun accessories including 200-round ammo chest, linking/delinking tool, large AA sight, manual and various tools and canvas covers.

(Robert G. Segel Collection)







(top left) Breech mechanism of an M2 .50 caliber water-cooled machine gun. Note the canvas bag to catch the ejected metal links. (top right) Overall view of gun with complete M3 AA mount including an M3 water chest, recirculation pump and 200-round ammunition chest. (bottom) Receiver markings. (All three photos Robert G. Segel Collection)

M2-HB .50 Caliber Machine Gun

The M2-HB infantry .50 caliber machine gun saw widespread use in all theaters of the war. It was mounted on virtually every type of vehicle, including tanks, half-tracks, trucks and jeeps. Ordnance Department records indicate that 347,524 ".50 HB Flex." (Heavy Barrel, Flexible) infantry machine guns were manufactured during World War II. The largest manufacturer of M2-HB .50 caliber machine guns was the AC Spark Plug Company. Other firms that turned out varying quantities of the weapon during the war were Frigidaire, Colt, Buffalo Arms Company, Brown-Lipe-Chapman (GM), Guide Lamp Division (GM) and the Kelsey-Hayes Company. A total of almost two million .50 caliber machine guns were made during World War II (1,964,418), but the bulk of these were for aircraft use. The M2-HB air-cooled and M2 water-cooled machine guns accounted for something less than a quarter of the total. It should be noted that some water-cooled .50 caliber machine guns were converted to air-cooled configuration (and possibly even vice-versa). Table #36 gives the annual production totals for both types of M2 .50 caliber machine guns.

Ordnance photo of an M2-HB air-cooled machine gun and anti-aircraft mount. (Konrad F. Schreier, Jr.)

Marines of the 4th Division, Kwajelein Atoll, Marshall, Feb. of 1944, getting their M2-HB .50 caliber machine gun into aciton. (USMC)

The M2-HB air-cooled .50 caliber proved to be a superb performer in many applications. Its days as primarily an antitank weapon were over due to the increased armor in modern tanks, but the .50 caliber could wreak havoc on light skinned vehicles such as trucks. An illustrative example of the .50 caliber's effectiveness is related in a 1943 issue of *Army Ordnance* magazine.

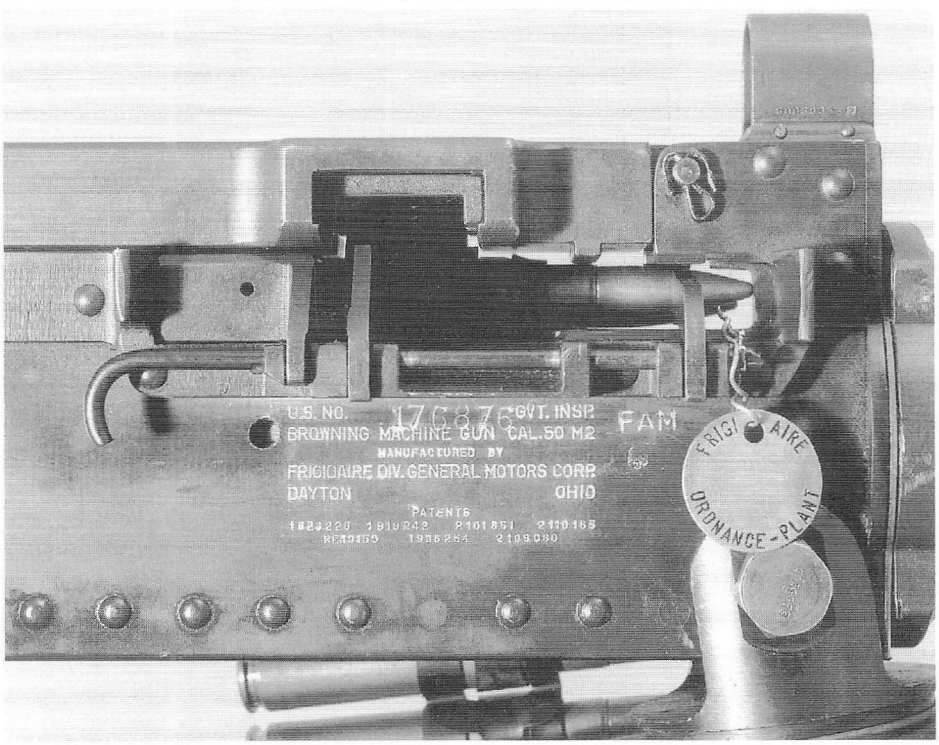
In the Solomons on one occasion the Marines surprised a Jap transport column that appeared to consider itself out of machine gun range and shot it up with caliber .50 Brownings. The heavy slugs smashed up the Jap trucks and made the Jap soldiers who were hit by them look as if they had been run over by the trucks.

A World War II veteran reports the following on one occasion when he had the opportunity in Burma during the Spring of 1945 to use a .50 caliber M2-HB on an enemy cannon.

A young 2nd Lt. was up at an OP on one side of a canyon when a Jap 77-mm mountain howitzer was observed on the other side firing on a road at the outlet of the canyon. It was estimated that the gun was some 1,000 to 1,200 yards away. He had a .50 Browning on a post mount on his jeep. He set the .50's sights for 1,100 yards and using an aircraft belt (tracer, ball, incendiary, AP, tracer mix) he fired a half-dozen five round bursts around it. The cannon quit firing. Later recon found the gun; it had been hit by a number of rounds, and one had gone through its recoil mechanism, another had dented its barrel, and several had gone through its gunshield. There was evidence—blood—of enemy casualties.

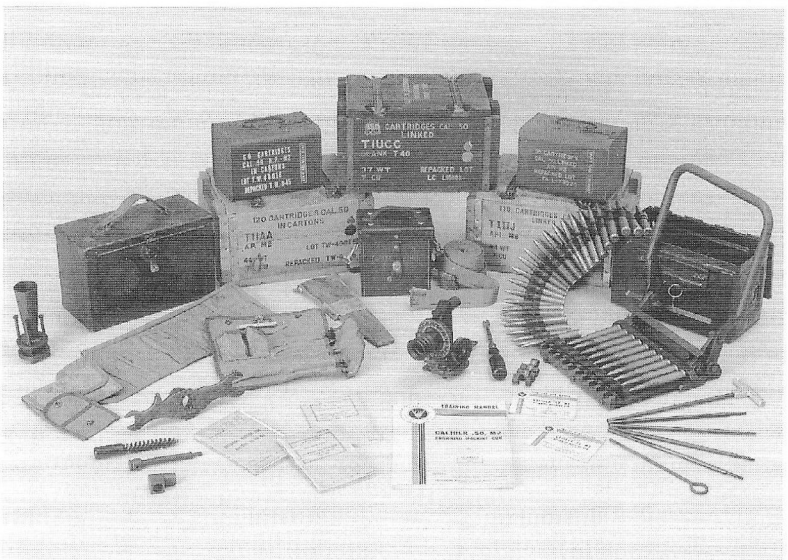
The authorized allowance of air-cooled M2-HB .50 caliber machine guns for a Marine Division in 1942 was 360. This number was reduced to 343 guns in 1943, 161 in 1944 and 162 in 1945. The Army organized its heavy weapons companies to have three .50 caliber machine guns, with one each to go to a headquarters company and an antitank company. Of course, these authorized allowances were rarely followed precisely, and the number of such weapons in front line use was often higher.

The ground-mounted M2-HB .50 caliber machine



Three views of an M2-HB .50 caliber machine gun with the 120-round metallic link ammunition belt and M3 tripod. The photo to the right details the receiver markings; this example was manufactured during World War II by General Motors' Frigidaire Division.

(Robert J. Boucher Collection)



(top) A "Quad Fifty" half-track of the 390th AAA Battalion, 26th Infantry Division, Saahlauteen, Germany, 1945. (U.S. Army)

(bottom) .50 caliber M2-HB accessories including several types of ammunition cases, linked belt, tools, M1 telescopic sight, flash hider and linking/delinking tool. (Robert J. Boucher Collection)

gun had much in common with the water-cooled M1917A1 .30 caliber machine gun. While very effective performers in their own right, both weapons weighed a great deal, which precluded their use in fast moving assault. The .50 caliber had the added disadvantage in the fact that its ammunition weighed a good deal more than .30 caliber ammunition, which obviously caused more supply and transportation problems. Although the authorized allocation of .50 caliber ammunition was 600 rounds per gun, supplies were kept well above this level whenever possible.

Two types of hand carts were used with the M2-HB .50 caliber ground mount machine guns. The M5 (spoked wheels) and the M5A1 (cast aluminum wheels) had quick release brackets for the .50 caliber machine gun's M3 tripod. In addition to carrying the machine gun and tripod, the M5 and M5A1 hand carts made the transporting of the heavy .50 caliber ammunition much easier.

The .50 caliber saw less service as purely an anti-personnel weapon than did the various types of .30 caliber machine guns, particularly in the Pacific. Col. John George makes this observation regarding the Army's employment of the .50 caliber machine guns in the Pacific theater.

Our ground mounted .50s were other guns of which we didn't make much use. They too had impressed all of us by their stellar performance on the range; they were accurate, powerful and easy to aim and fire.

They were not, however, easy to carry; we could not practically move them inland beyond the beaches and groves. Even if we did get the guns themselves up into the mountains there would still remain the problem of ammunition supply— and for .50s that would mean tons more for the carrying parties.

However, even disregarding the weight of our .50s, we could still have permissibly left them behind on the basis of a lack of appropriate targets. These guns are primarily anti-vehicular weapons and there were few opportunities to fire at Japanese tanks or trucks.....

Although the .50 caliber machine gun may not have been widely used in the anti-personnel role, it performed in an awesome manner when called upon to do so. The official *History of U.S. Marine Corps Operations in World War II, Vol. III,* gives this illustrative example of the effectiveness of the .50 caliber.

...gunners of Batteries E and F...leveling enfilading fire from their .50 caliber machine guns into the area forward of Battery D. That fire was conclusive - it literally tore the Japanese to pieces...

The M2-HB.50 caliber machine gun saw more use in Europe, Italy and North Africa than in the Pacific due to the nature of combat in those theaters. The

more open terrain and the abundance of Axis vehicles played to the strengths of the Browning .50 caliber machine gun. The .50 caliber machine guns were put to some innovative uses in Europe. One of the more spectacular was the "Quad Fifty," which consisted of four M2 .50 caliber machine guns mounted in the M45 turret that was typically mounted in a M16 half-track. This combination was improvised in England prior to the Normandy invasion and provided an awesome amount of firepower coupled with a high degree of mobility. An ETO armored infantry veteran recalls the effective use of the Quad Fifty half-track in the weeks after the Battle of the Bulge, when the American armies were racing toward the Rhine.

Whenever we came to one of the never-ending number of small French villages we had to be certain that the Germans were not waiting to ambush us. This was one of their favorite tactics. In order to be sure the village was clear we would run a half-track mounted with four .50 caliber machine guns wide open down the main street and fired into every building. When we reached the end of the block, we would repeat the process on the other side. We counted on the high speed of the half-track and the firepower of the .50s to keep the Germans from nailing us. It usually worked! The .50 caliber machine gun was one hell of a weapon.

The M2-HB.50 caliber machine gun was unquestionably the best weapon of its type fielded by either side during World War II. After the war, it remained the standard heavy caliber American machine gun and saw wide service in Korea and Vietnam, with only very minor changes from its World War II configuration.

Remarkably, it is still the standard weapon of its type in United States military service today! The old Browning M2-HB .50 caliber machine gun will not go away. The weapon gave valuable service in the recent Gulf War, just as it had over 50 years ago during World War II. Few front-line infantry weapons can match this span of service, but the M2-HB .50 caliber machine gun has never been considered just another weapon.

Collector Notes

.30 CALIBER MACHINE GUNS

M1917A1
Water-Cooled Machine Gun

An M1917A1 machine gun mounted on its tripod and with its water-cooling apparatus attached makes a very impressive weapon in a collection. While not overly common, someone wishing to acquire such a weapon can still do so although, as with all machine guns, prices are steadily rising.

Unaltered WWI-vintage M1917 machine guns are quite hard to find since virtually all of them were modified to M1917A1 specifications prior to World War II. These can be identified because they were made by Remington, Colt or New England Westinghouse and will have such early features as bronze components in the water jackets, the old type of receiver bottom plate and sights calibrated for the M1906 or M1 cartridges. The guns modified by Rock Island in the late 1930s will exhibit the later features added during the remanufacturing program instituted at that time.

The M1917A1 machine guns made during World War II were made by Savage Arms, High Standard, Buffalo Arms, Kelsey Hayes, Frigidaire, AC Spark Plug, Brown-Lipe-Chapman and Saginaw Division of General Motors. Most of the post-WWII guns were made by Inland and are essentially identical to the late production WWII M1917A1s.

Some M1917A1 machine guns supplied to foreign governments over the past 40 or so years have shown up on the collector's market in this country. Before the law was changed to prevent such practices, the side plates were stripped from the guns (which rendered them useless) and removed them from the restrictions imposed by the National Firearms Act of 1934. New serially numbered side plates were manufactured and, after being duly registered, were riveted back on to the receiver, thus making a "new" machine gun. Guns restored in this manner are relatively common and are generally less desirable and somewhat cheaper than totally unmodified guns. Likewise, the post-WWII guns usually sell for a bit less than the World War II and earlier guns given comparable condition. Some M1917A1 machine guns will be found converted to 7.62mm NATO caliber. This is a relatively simple conversion with the Browning machine guns and is popular with some shooters because the weapon can be changed back to .30-06 caliber without much trouble.

A number of tripods will be found today that have been salvaged from torch-cut demilled parts welded together. If a tripod is sold as an original item, it should be closely examined to verify that it is not one of the welded-together tripods.

The M1917A1 water-cooled machine gun was a formidable weapon and provided valuable service to the infantry during the Second World War. Its days as a front line combat weapon are long gone, but its contributions to the cause of freedom during this war should not be forgotten.

M1919A4 Air-Cooled Machine Gun

An M1919A4 with its perforated barrel jacket and M2 tripod is an impressive-looking weapon and makes an eye-catching addition to a World War II arms collection. From the collector's viewpoint, the M1919A4 has much in common with its water-cooled counterpart, the M1917A1. Both weapons are still available to the collector of automatic weapons. In addition to Saginaw, the WWII M1919A4 machine guns were made by the same firms that produced the M1917A1. Like the M1917A1, many of the post-WWII M1919A4 machine guns were made by Inland. The M1919A4 machine guns produced after June of 1952 had stellite-lined, chrome plated barrels. This feature is helpful when attempting to identify the vintage of a particular weapon. Many of the World War II guns had the later type of

M1919A4 .30 caliber air-cooled machine gun with oval slotted cooling vents in the barrel jacket.
(Konrad F. Schreier, Jr.)

barrels added when they were rebuilt after the war.

Early production M1919A4 machine guns had oval-shaped barrel cooling perforations but this was soon changed and the vast majority of guns were manufactured with round holes in the barrel jacket.

A number of M1919A4 machine guns have been brought back into the United States from overseas in the past couple of decades. Newly manufactured side plates have been installed on these guns and registered with the ATF. As stated, this practice is no longer allowed although the guns previously registered are still transferable thorough proper channels. Many 7.62mm M1919A4 machine guns are around, and these can easily be changed to .30-06 caliber if desired. Many of these 7.62mm conversions were done by the U.S. Navy and are often fitted with a prong-type flash suppressor. These modified M1919A4s were standardized by the Navy as the "Machine Gun, 7.62mm NATO, Mark 21, Mod. 0." Of course, all such guns are post-WWII modifications.

As mentioned in regards to the M1917A1 tripod, some M2 tripods may be found today that have been built from torch-cut parts. If properly done, such tripods can suffice for shooting purposes, but the original, uncut items are the most popular for collecting.

The M1919A4 machine gun is often overlooked when the great weapons of World War II are discussed. However, few other weapons of the war were as reliable and effective as the M1919A4 machine gun, and few played a larger role in our infantry small arms arsenal.

1919A6 Machine Gun

From a collector's viewpoint, the M1919A6 has much in common with the other .30 caliber machine guns.

Although not rare, the M1919A6 is much harder to find on the collector's market today than the M1919A4. This is to be expected since approximately 10 times more 'A4s were made. A number of M1919A6 machine guns have been provided to other nations since World War II, and some have turned up back in this country without their side plates. As with the other Browning machine guns we have discussed, some of these guns have had new side plates manufactured and installed and the weapons properly registered. Such guns are not as valuable for collecting purposes as totally original guns. A few M1919A6 machine guns may be encountered from time to time that may have been salvaged from demilled machine guns by welding up the cut parts and refinishing the metal. Such guns are less desirable than those with newly made side plates and certainly less sought after than totally original weapons for collecting purposes.

The post-WWII M1919A6 machine guns seem to be a bit more common than the 1943-1945 manufactured guns, but prices usually do not vary a great deal. As with the M1919A4 machine guns, the M1919A6s produced after mid-1952 had chrome plated, stellite-lined barrels.

The basic accessories of the M1919A6, such as ammunition belts, are the same as used with the M1919A4. The M1919A6, like all of the .30 caliber Browning machine guns, are fun to shoot and make impressive additions to military collections.

Although the M1919A6 was not an overwhelming success, it demonstrated the amazing versatility of John Browning's machine gun designs. Whether a water-cooled monster such as the M1917A1 weighing nearly 100 pounds on its tripod or the air-cooled M1919A6 weighing just over 32 pounds, the .30 caliber Browning machine guns of World War II were among the workhorses of the American infantry. Few weapons were more reliable and provided better service to our troops than these guns.

.50 CALIBER MACHINE GUNS

As with the .30 caliber machine guns previously discussed, there are a number of collectors interested in the .50 caliber machine gun. The most available and popular variant with most collectors is the air-cooled, tripod-mounted M2-HB. The water-cooled .50 caliber is rarely seen today because few survived World War II and it is estimated that only some 15 or so are in private hands. At approximately 500 pounds, few are carried around to plink at tin cans. The air-cooled M2-HB is much more available; and, although far from a lightweight rig at over 125 pounds (including its tripod), a number of people enjoy shooting their guns even if the ammunition goes for about a dollar or more per round.

As with the post-WWII M1919A4 and M1919A6 machine guns, the M2 .50 caliber guns made after June of 1952 have stellite-lined, chrome-plated barrels. These improved barrels were also added to the WWII-vintage guns when they were rebuilt and refurbished after the war. Another relatively minor post-war modification was an improved headspace adjustment mechanism.

A few .50 caliber machine guns may be found today with replaced side plates, which indicate that such a gun was reimported back into the United States from overseas and was one of the many thousands of guns provided under various military aid programs. A few demilled guns have been restored in the past, and the receiver should be closely examined to ascertain that the gun is all original. A restored demill may be a good shooter if the job was well done, but such a gun would have limited collector value.

There are several interesting accessories produced for the .50 caliber machine gun. One of the most notable is a telescopic sight that was developed prior to World War II but seldom used. The long range performance of the weapon made the use of a telescope more than a theoretical advantage and such weapons were sometimes used in quasi-sniping roles.

As is the case with the other machine gun tripods discussed previously, a number of M3 tripods may be observed that are salvaged from demilled parts. Such tripods are not as valuable or as sought after for collecting purposes as are the original, uncut items.

While all of the American machine guns of World War II make impressive collector pieces, few can match the impact of the M2-HB machine gun mounted on a tripod. Its appearance makes it clear that it was (and is) a weapon with which to be reckoned. As one author aptly stated, "There isn't a machine gun that has received more heartful appreciation from its users and fear from its victims...than Mr. Browning's cal. .50 shooting machine."

The Bazooka
and The Boys Antitank Rifle

The evolution of warfare in the 20th century has resulted in ever-increasing challenges for the infantryman. Beginning in the First World War, the average foot soldier was faced with stopping weapons that were unimaginable less than a decade or two earlier. For example, airplanes and tanks made their debut during World War I, and the introduction of these weapons caused the armies of both sides to look for ways to counter the new threats.

As we have discussed, the development of the Browning .50 caliber machine gun was a direct result of the introduction of the German 13.2mm antitank rifle. During the 1920s and 1930s, the U.S. military did little experimentation with antitank weapons. The .50 caliber machine gun was considered an adequate infantry weapon for use against the lightly armored tanks of the era. This remained the case until virtually the time of America's entry into the Second World War.

The overwhelming success of the early German victories of 1939-1940 was due in large measure to the innovative and aggressive use of armored units. The American military establishment recognized that it was quite unprepared to deal with the technology of modern armored warfare. It was apparent that the infantry's standard antitank weapon, the .50 caliber machine gun, was totally inadequate for use against the more heavily armored modern tanks. Clearly, a new type of antitank weapon capable of being used by the infantry was needed and needed in a hurry.

The weapon that is now commonly known as the bazooka was the result of a fortuitous and timely combination of two divergent technologies. The individual most responsible for the development of the bazooka was Leslie A. Skinner. The son of an Army surgeon, Skinner was born in 1900. He had a fascination with rockets since his early teens and built a number of working models. Skinner was appointed to West Point and was commissioned in the U.S. Army in 1924. He transferred to the Ordnance Corps in 1931 and was assigned to develop rockets fired from airplanes. Skinner was in the enviable position of having his vocation and avocation coincide. Skinner left his duties in 1933 to study for a year at M.I.T. and returned to Aberdeen in mid-1934. He continued his experiments with rockets and often used money from his own pocket to fund the research. Skinner was transferred to Hawaii in 1938, and his rocket research came to a halt until he was again assigned to Aberdeen in November of 1940. By this time, the German onslaught in Europe was in full force, and the Ordnance Department wanted Skinner to concentrate on the task of developing an antitank weapon using his rocket research. Skinner had the good fortune of having a capable assistant assigned to the project, Lt. Edward G. Uhl. Skinner and Uhl began testing a prototype design in early 1942, which was a simple metal tube with an electrical firing system operated by two flashlight batteries. Skinner's design overcame the typical problem common to other experimental antitank weapons being tested, that of excessive recoil. Since the tube was open on both ends, the rocket's exhaust gasses were vented out the back and the recoil force was minimal. The new rocket launcher worked well but the weapon had one big problem. It could not operate with an explosive charge powerful enough to penetrate a tank's armor. As stated in the book, *There's A War to Be Won,*

By the Spring of 1942 Skinner and Uhl had broken the back of every obstacle but one; they didn't have an effective warhead. They had a rocket that flew straight and true. What they didn't have was a weapon.

Even as Skinner was working on his rocket launcher, a totally unrelated Ordnance Department project was underway. In late 1940, a young Swiss engineer,

Henry H. Mohaupt, approached the Ordnance Department with a proposal for a new type of antitank explosive. Mohaupt's design was based on a previously discovered but unrefined concept of the shaped charge. This type of design focused an explosive charge at a single concentrated point that allowed a relatively small amount of explosive to punch a hole through heavy armor. Some of the American Ordnance people were skeptical of the idea but subsequent testing proved that it did indeed work. Since the threat of German tanks loomed large at this time, a crash program was instituted to develop an antitank grenade based on the shaped charge concept. In late 1941, on the very eve of World War II, this program resulted in the adoption of the "Grenade, High-Explosive, Antitank, M10." Since hand-throwing the three pound grenade was not possible, a ground mount spigot-type launcher was developed. This proved unsuccessful as the angle of trajectory was unsuitable. The only means remaining of launching the M10 antitank grenade was by means of either a rifle grenade launcher or a launcher fitted to a .50 caliber machine gun. Unfortunately, the extreme recoil generated by firing the heavy grenade shattered rifle stocks (and sometimes soldiers' shoulders as well) and even bent the tripods of the .50 caliber machine guns. Even though production continued on the M10 grenade, they were piling up in Ordnance warehouses since there was no practical way to launch them. Thus, at the beginning of World War II, the American infantryman still did not have an effective antitank weapon at his disposal.

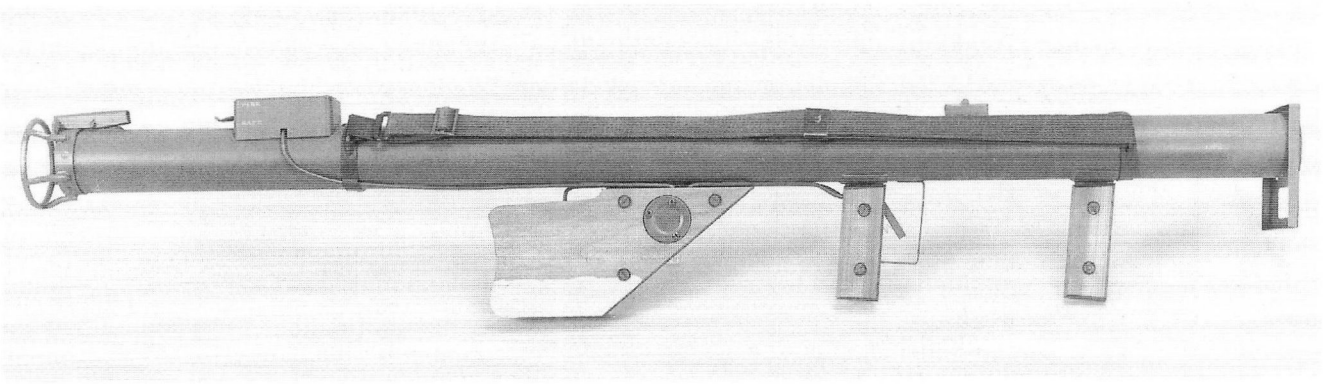
As Skinner was pondering the problem of finding a suitable warhead for his rocket launcher, he discovered some M10 grenades at Aberdeen and it immediately became apparent to him that this was the solution for which he was looking. The M10 grenade weighed about three pounds and could punch a hole through thick armor, which was exactly what he needed. Skinner and Uhl fashioned the first projectiles from dummy M10s found on Aberdeen test ranges and added a rocket motor and fins. In April of 1942, the Frankford Arsenal constructed a launcher based on Skinner's original rough design. The Frankford Arsenal prototype had a 54" long tube which was 2.36" in diameter. The inside diameter of the tube was dictated by the outside diameter of the M10 grenade. The length was calculated by Skinner as the minimum needed to allow the rocket motor to completely burn out before leaving the tube.

Skinner and Uhl took their new weapon to be tested at Aberdeen and, as luck would have it, they arrived as a demonstration of various other antitank weapons was in progress. A moving tank was used as a target, and Skinner and Uhl quietly took up a position at the end of the firing line. Uhl had fashioned a crude sight from a piece of wire he found on the ground. As the tank approached them, Uhl fired a rocket and hit it

Lt. E.G. Uhl firing the experimental "T1" rocket launcher. This weapon was soon refined and adopted as the M1 bazooka. Photo dated May of 1942. (Konrad F. Schreier, Jr.)

Photo taken at Camp Hood, Texas, of well-known radio comedian Bob Burns (right) holding his comic musical instrument "The Bazooka." Major Ralph Sleator is holding the newly adopted M1 rocket launcher, which soon became universally known as the bazooka due to its resemblance to Burns' instrument.
(Konrad F. Schreier, Jr.)

Ordnance Department photograph showing a standard early production M1 bazooka (top) and a prototype example (bottom) with a single hand grip. (U.S. Army)



Exact replica of an early M1 bazooka. Note the contact box on top of the rear portion of the tube. (Hayes Otoupalik Collection)

with the first shot. Before the tank could turn around, Skinner fired and hit it with the second round. Excited Ordnance officials quickly converged on the pair and were soon firing the new rocket launcher as well. One of the people who fired the weapon was Maj. General G.M. Barnes of the U.S. Army's Ordnance R&D Division, and he was instrumental in having the launcher immediately ordered into pilot production. This was shortly followed by an order to place the weapon into full production. Such a quick decision to place a weapon into production before the normal testing was an unusual procedure and pointed out the desperate need for an infantry antitank weapon. It is reported that when Skinner's superiors in the Ordnance Department discovered that he didn't "go through channels," he "...found himself the guest of honor at a private, very thorough chewing out covering all the bases from lack of loyalty to insubordination."

In any event, the new rocket launcher was recognized as the answer to the gap in our infantry arsenal regarding antitank weapons. The weapon was officially standardized on June 30, 1942, as "Launcher, Rocket, AT (Antitank) M1" and the rocket as the M6. The weapon was soon dubbed the "bazooka" since it had some resemblance to a musical instrument used by a well-known radio comedian of the day, Bob Burns. Although the term bazooka was not officially adopted, it quickly caught on and was universally used throughout the war.

The General Electric Corporation was selected to build the new weapon and on May 19, 1942 the firm was given a letter purchase order to "design, develop and produce" 5,000 bazookas in 30 days. This was over a month before the official adoption of the bazooka. GE accepted the order even though it would ordinarily have taken at least six months to accomplish such a task. General Electric's Bridgeport Works tackled the job and within 24 hours the first design drawings were finished. Just four days later, several test models were in the hands of Army representatives for evaluation, and by the end of the month at least 20 test models had been completed. The testing took over two weeks before approval was given to begin production. This left only eight days to manufacture the 5,000 bazookas. The GE people worked feverishly to complete the order. Steel was brought in from Pittsburgh by truck drivers working around the clock in relay shifts, and some material was delivered by airplane. It is reported that an Army Ordnance officer working on the project was bringing a trunk load of bazooka stocks to the factory in his automobile and was stopped for speeding by a state policeman. When the policeman learned the nature of the delivery, he provided a personal escort to the plant.

While General Electric was producing the first 5,000 bazookas, the firm of E.G. Budd Company was given a contract to make 25,000 M6 antitank rockets and 5,000 M7 practice rounds.

The Army desperately wanted bazookas in the hands of the troops soon to be sent to North Africa and every effort was made to speed them on their way. As stated in the book *Men and Volts at War,*

As the bazookas came off the line they were hustled into waiting Army trucks, and were on their way to a port of embarkation before the stain on the gunstocks was dry. The last of the 5,000 bazookas of this big job came off the line on the eighth day with 89 minutes to spare before the expiration of the Army's time limit.

The initial order for 25,000 M6 rockets was increased in June of 1942 to 75,000 rockets. In July the number of bazookas on order was increased to 75,000 with delivery to be made before the end of the year.

The M1 bazooka weighed approximately 18 pounds and was 54" long with a 2.36" diameter bore and was remarkably similar to Skinner's original pro-

totype model. A front sight was welded on the barrel near the muzzle that could be used from either the left or right side. It had four aiming points corresponding to 100, 200, 300 and 400 yards. The rear sight was a simple metal leaf. Two hand grips were welded to the bottom of the tube. The rear grip contained the trigger and electrical contact switches. A wooden shoulder stock was fastened to the bottom of the tube, which also held two dry-cell flashlight-type batteries in a sliding compartment. One battery provided the power to ignite the rocket motor and the other was a spare. A circuit tester consisting of a single small light bulb was placed on the left side of the stock that could be checked to ascertain if the electrical firing system was operating properly. This proved to be a valuable feature since malfunctions due to weak batteries were common.

The M6 antitank rocket had a wire taped to the outside of the body that was fastened to a contact box on top of the bazooka's tube. An electrical charge carried by the wire ignited the rocket motor. The M6 rocket was equipped with a safety pin that was removed prior to placing the rocket into the tube. This was necessary because an armed rocket could easily explode if dropped. A practice rocket similar in construction to the M6 but without the high explosive warhead was adopted as the M7.

A bazooka team consisted of two men, the firer and the loader, who worked closely together. The authorized allowance for M6 rockets per launcher was two bags, each bag holding three rockets. Early World War II Army training materials stressed two things about the M1 launcher and M6 rocket. The first was to "keep away from the rear" of the tube due to the hot gasses emitted when a rocket was fired. The outside wiring of the rocket was also recognized as a critical area and the training emphasized that "a lot depends on the wire."

The new M1 bazookas were soon aboard troop ships headed for North Africa. The new weapon was classified as secret and given the code name "The Whip." Virtually none of the troops had seen, or even heard of, this mysterious weapon prior to encountering it enroute to North Africa. The Center of Military History book *The Ordnance Department: On Beachhead and Battlefront* reports that

On the evening before embarkation for North Africa, one troop commander shocked General Eisenhower by saying that he was completely at a loss "as how to teach his men the use of this vitally needed weapon (the bazooka)." He said, "I don't know anything about it myself except from hearsay."

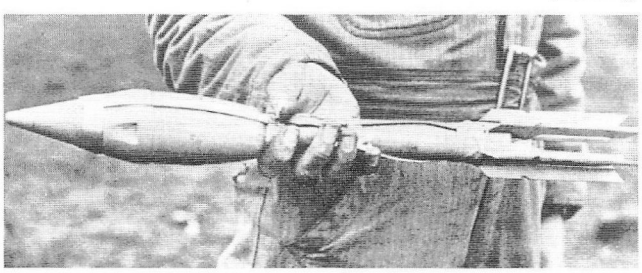
This utter lack of familiarity with the bazooka was echoed by a member of the Army's Third Division who recalled that "members of the Division opened crates of bazookas only on shipboard bound for North Africa and were puzzled as to what the contraptions were."

Despite having to train aboard ships and with no time for practice firing, the bazookas in the hands of the American GIs landing on the shores of North Africa soon made their mark. The first opportunity for our troops to fire the bazooka was not on the practice range but in combat. The bazooka's initial combat use was during the landings at Oran, Algiers and Casablanca. The book *Men and Volts at War* contains this account of one of the first recorded combat actions in which a bazooka was used.

...a small but strong coastal fort was giving considerable trouble to the American invaders, one lone soldier detached himself from his landing party, waded ashore by himself, and with one shot from his bazooka, secured the surrender of the fort.

Other stories of the bazooka's effectiveness in the early stages of the Tunisia Campaign emerged, including several reports of enemy tanks exploding after being hit by a single bazooka rocket and a soldier

Early model M1 bazooka rocket launcher. The M1's contact box on top of the tube is clearly visible as are the two-hand grips. Later models eliminated the contact box and one of the grips. (U.S. Army)



Early M6 bazooka antitank rocket. The wires located on the outside of the rocket can be seen in this photo. Improved rockets had internal wiring that was less vulnerable to damage. (U.S. Army)

Two U.S. Army soldiers firing M1 bazookas. Despite some problems encountered with the early M1 variant, these weapons were the most effective infantry antitank weapon available at the time. (U.S. Army)

blowing off a tank's turret with one shot. Another oft-repeated story was the surrender of a column of 10 German tanks after the commander witnessed a tree shattered by a bazooka rocket, which caused him to assume that his command was under attack by 155mm artillery. If the story was true, one must wonder about the experience and courage of the German commander. In any event, many stories about the bazooka's first combat actions were impressive.

However, serious problems with the new bazooka began to come to light soon after the weapon saw combat use. Malfunctions were common, particularly with the rocket, which hampered the weapon's overall effectiveness. Despite the above stories regarding the value of the bazooka, the commanding general of the Army's Armored Command in Tunisia at the conclusion of the campaign remarked that he "...could not find anyone who could say definitely that a tank had been stopped by bazooka fire."

In September of 1942, 600 bazookas were shipped to the British in Suez for use in the Middle East. After a demonstration, the British concluded that "...the weapon was not suitable for desert warfare, since the desert provided none of the concealment, such as trees or bushes, that the bazooka operator needed to hide him from small-arms fire until a tank came close enough for his rocket to be effective." The British did not issue any bazookas and the lot of 600 was supposedly placed in storage.

The bazooka had previously been demonstrated to some Soviet observers in Washington, DC, in May of 1942. They immediately requested a large shipment. Little is known of the Soviets' subsequent utilization of their bazookas, but it is known that the Germans captured one or more. They copied the design and increased the size of the rocket to 88mm, and the

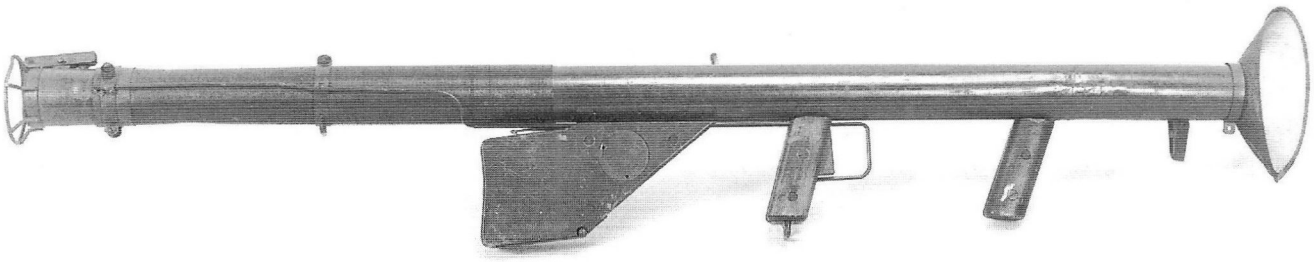
Excellent photo dated November 16, 1944, showing a U.S. Army Antitank (3" cannon) Company near Schalfenberg, Germany under fire from Nazi troops. The AT cannon is supported by soldiers armed with an M1A1 bazooka, M2 HB .50 cal. machine gun and an M1 rifle. (Konrad F. Schreier, Jr.)

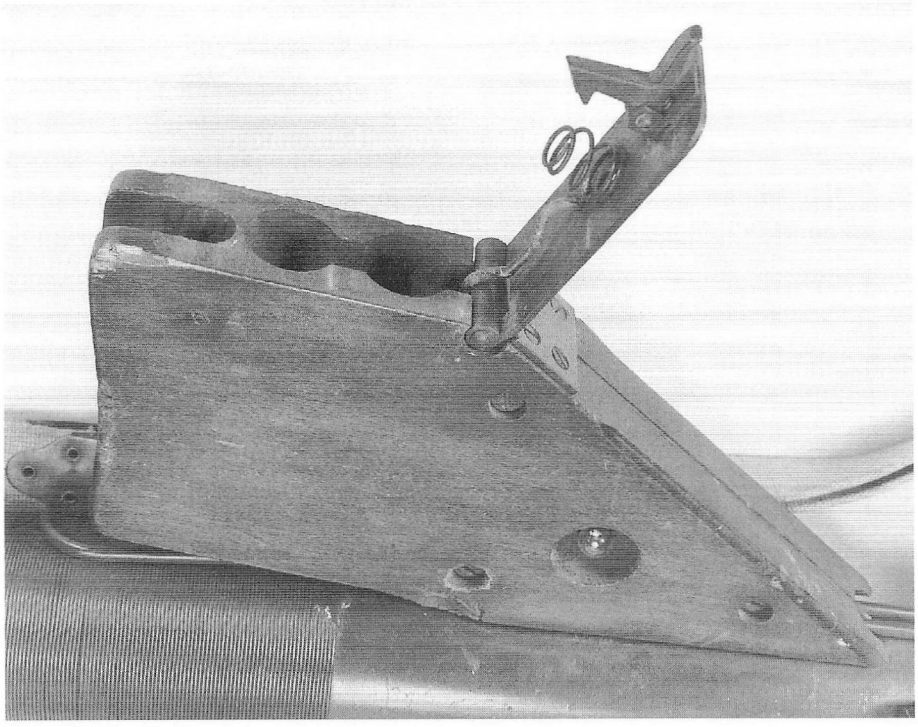
resulting weapon was known by the Germans as the "Panzerschreck."

The problems with the early use of the bazooka resulted in the War Department suspending its issue in May of 1943 until an evaluation could be conducted and improvements made.

The frequent malfunctions encountered in the Tunisia Campaign with the bazooka centered mainly around the unreliability of the M6 rocket. The contact wire taped to the outside of the rocket body was vulnerable to damage that could easily render the rocket inoperable. In addition, high temperatures adversely affected the reliability of the rocket motor and could possibly result in a premature explosion. The bazooka itself came in for some criticism including the exposed contact box on top of the tube and the lack of any sort of shield or screen on the front portion of the tube to protect the firer from unburned rocket exhaust particles. The Ordnance Technical Committee recommended a redesign of the rocket motor and a change in the composition of the propellent fuel. Protective gloves and face masks were procured to help shield the soldier firing the bazookas from the unburned particles, but these proved to be inconvenient and uncomfortable. Such problems were understandable in a weapon that was rushed into production without the normal testing and refinement process. Frankly, it is amazing that the M1 bazooka worked as well as it did.

Unfortunately, the Army was on the verge of invading Sicily when the bazooka was suspended from issue. This understandably caused some consternation among the troops soon to be involved in the upcoming operation. It was felt by many that the War Department had been too quick to suspend the bazooka despite the problems encountered in North Africa. It was almost universally believed by the infantry that a bazooka with some problems was infinitely better than no bazooka at all. With such intense lobbying, the War Department relented and allowed continued issue of the M1 bazooka and the M6 rocket, although restrictions were given against using the weapon at high temperatures.





(above) M1A1 bazooka. Note that the "contact box" of the M1 bazooka has been replaced by the two small contact projections near the end of the tube. This is an early variant with two hand grips. Later M1A1 bazookas had only a single hand grip containing the trigger assembly. (Hayes Otoupalik Collection)

(left) View of the battery compartment of the M1A1 bazooka. The small light bulb used to test the bazooka's electrical system is visible in this photo. (Hayes Otoupalik Collection)

As field reports were analyzed and on-going testing evaluated, an improved bazooka was adopted in July of 1943 as the M1A1. The M1A1 differed from the M1 in the following ways.

(1) The contact box of the M1 was removed and two spring contacts added on the rear portion of the tube.

(2) The front hand grip was eliminated on later model M1A1 bazookas.

(3) The center of the tube was wire wrapped for about 20" to increase its strength.

(4) A removeable truncated conical wire flash screen was added to the front of the launcher to protect the face of the firer.

In addition to improving the bazooka itself, the standard M6 antitank rocket was replaced by the M6A1. This redesigned rocket had an improved rocket motor and the troublesome outside contact wire was replaced by an internal wire. A virtually identical practice rocket with a dummy warhead was standardized as the M7A1.

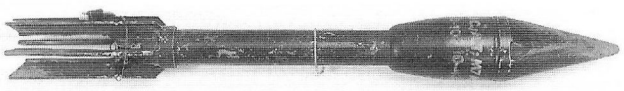
The M1A1 bazooka and M6A1 rocket eliminated many of the problems discovered in the original M1 launcher and M6 rocket, and bazookas soon became a vital part of the American infantry arsenal. Both Army and Marine Corps units clamored for bazookas as their reliability improved and their effectiveness became known. The following was the authorized allowance of bazookas to a U.S. Army division from 1943 through the end of the war:

Weapons Platoons .....3 bazookas
Heavy Weapons Company.....7 bazookas
Headquarters Company.....8 bazookas

The Army Tables for Organization and Equipment (TO&E) for World War II authorized 112 bazookas for a typical infantry regiment and 29 for a typical infantry battalion.

The Marine Corps Divisional TO&E authorized the following number of bazookas:

1942.....132 (M1)
1943.....243 (M1)
1944.....172 (M1A1)
1945.....153 (M9A1 or M18)



Later issue M7A1 2.36" bazooka rocket. Note the lack of wiring as found on the M6 rocket. (Hayes Otoupalik Collection)

Although the improved M1A1 bazooka remedied many of the problems encountered with the original M1 variant, there were still some deficiencies that needed to be corrected. The electrical ignition system continued to cause problems, especially in the Pacific theater. Corrosion of the firing mechanism due to the constant dampness was a continual headache, and experimentation was done with a percussion element using a shortened .410 gauge shotgun shell to fire the rocket motor instead of an electrical impulse. This project was dropped due to interchangeability problems. The plating of key parts to increase their resistance to corrosion was implemented, which marginally helped.

Another drawback of the M1 and M1A1 bazookas was the fact that the 54" tube was cumbersome to carry through jungle foliage and underbrush and was unwieldy for parachute operations. At the urging of the Airborne Command, a launcher that could be broken down into two separate components was developed. Also, a trigger-operated magneto was developed to replace the dry cell battery firing system. Another refinement added to this design was the elimination of the wooden shoulder stock and the substitution of a metal shoulder rest that could be used in two positions. Another improvement included the introduction of a safety switch. The two-piece improved bazooka was standardized as the M9 in October of 1943. Prior to large-scale production of the M9, it was discovered that the coupling mechanism was not as sturdy as it should be and an improved coupling was adopted. The revised bazooka was adopted as the M9A1. The M6A1 and M7A1 rockets were further refined with reshaped ogives to lower the angle of effective impact and cylindrical fixed fins to increase stability in flight. The change from copper to steel cones in the warhead improved the armor penetrating performance by as much as 30 percent. In addition, better waterproofing of the fuse assembly increased reliability under inclement conditions. The improved rockets were standardized as the M6A3 and the M7A3 (practice).

A member of the 101st Airborne Division preparing to climb into a C47 transport during the "Operation Market Garden" jump in September of 1944. The paratrooper is carrying an M1A1 bazooka. As can be seen, the one-piece bazooka was a bulky item for airborne operations and the M9/M9A1 variant, which could be broken down into two sections, was much handier. (U.S. Army)

The M9/M9A1 bazooka was much handier to transport because it could be easily disassembled into two sections, and the two sections of the tube could be fastened together for carrying. The standard M1 web rifle sling was issued with the M9A1 along with a canvas pouch that held the two sections of the disassembled launcher. The M9/M9A1 bazooka weighed 15.87 pounds and was 5 feet, 1 inch in length when assembled and 2 feet, 7.5 inches long when disassembled for carrying. Its rate of fire was listed at approximately 10 rounds per minute.

While the M9/M9A1 bazooka was a definite improvement over the previous designs, the lack of a suitable sighting system remained. The rather crude metal sights of the earlier models did not allow for precise sighting and were prone to damage. An optical ring sight was developed for use with the M9 bazooka, but its construction required the use of optical calcite which was in short supply. A marginally improved metal sight bar with a rear peep sight was substituted beginning in January of 1944. In August of 1944, a much improved optical reflecting rear sight that did not use any scarce materials was developed and approved for procurement. This new sight, the T90, was added as a standard component to the M9 and M9A1 bazookas beginning in September of 1944.

General Electric continued to be the sole producer of the bazooka until June of 1944, when the small firm of Cheney Bigelow Wire Works of Springfield,

Massachusetts, was awarded a contract for production of the M9A1 launcher. Demand for bazookas unexpectedly increased in the winter of 1944-45 and both General Electric and Cheney Bigelow were given additional production contracts.

The 300,000th bazooka was delivered by General Electric in late 1944 during a ceremony attended by Undersecretary of War, Robert P. Patterson. Production continued by both firms until contracts were cancelled in May of 1945. By this time, General Electric had produced approximately 450,000 bazookas (all variants) and Cheney Bigelow about 40,000 (M9A1s). It has been reported that the Philco Corporation Metal Products Division also manufactured a number of bazookas during WWII, but this has not been confirmed.

The only other major variant of the 2.36" bazooka consisted of a tube constructed of aluminum that reduced the weight to 10.88 pounds as compared to the M9A1 at 15.87 pounds. Its length was the same as the M9A1 as was its projected rate of fire. Its metal shoulder rest was of a slightly different configuration than that of the M9A1 bazooka. The two piece aluminum alloy bazooka was standardized as the M18 and was slated to replace the M9A1 bazooka. General Electric was working on an experimental order of 500 M18 bazookas when the war against Japan ended.

(top) M9A1 2.36" bazooka with sling. This example (serial #234165) was made by General Electric Co., the largest producer of the bazooka. Also shown is a practice 2.36" rocket and a rare and seldom used "twin piggyback" fragmentation grenade rocket. (Robert G. Segel Collection) **(bottom) The M9A1 bazooka disassembled for carrying. Also pictured is a scarce USMC camouflaged jump case (left), a protective face mask (center) and a rocket carrying case (right).** (Robert G. Segel Collection)

The 2.36" bazooka saw widespread use throughout the war. While generally effective, the weapon was not always equal to the tasks at hand. As an antitank weapon, the bazooka met with mixed success. It was relatively effective against the earlier German tanks and was normally devastating against the light Japanese tanks in the Pacific. The executive officer of the 1st Battalion, 6th Marines, Major James A. Donovan, Jr., noted that the bazooka "...was verified as a superior tank buster."

Many instances of the bazooka's success as an antitank weapon, particularly in the Pacific, have been recorded. The book *The Island War* contains the following passage regarding the bazooka's use on Guam.

One Marine sheared the turret off one tank with a bazooka and stopped two more before he was killed.

Another WWII Marine Corps report relates that

Bazookas knocked out the...tank with a direct hit which killed the driver. The rest of the crew piled out of the turret, screaming. The fifth tank, completely surrounded, attempted to flee. Bazookas made short work of it. Another hit set it afire, and its crew was cremated.

In this same vein, an Army officer who served on Okinawa reported that

The bazooka proved its worth when four Jap tanks came down the road, got through the front line and could have gotten through the Division CP and the beach, but decided to turn around. Bazooka teams got to the road and knocked them all out in three minutes. The regimental commander whose line was pierced said that the 37mm guns were ineffective. Bazookas were also used on pillboxes and a great deal of success was secured in directing fire on the pillbox embrasures.

(left) An interesting photograph that vividly illustrates the major advantage of the M9/M9A1 bazooka, left, over the M1A1 model, right. As can be seen, the M9A1 was much easier to carry through heavy underbrush. (U.S. Army)

(above) A weary GI, ETO, winter of 1944-45, armed with an M9/M9A1 bazooka. (U.S. Army)

Despite these instances, there were some problems encountered with the bazooka in the Pacific. A Marine Corps Ordnance report stated that "bazooka rockets...in poor condition from exposure to frequent rains, proved ineffective against the Japanese armor."

The bazooka was widely used in Europe and met with both successes and failures. As improved German tanks with thicker armor came on the scene, the 2.36" bazooka rocket often proved to be inadequate. A great many reports can be found to document the bazooka's frequent failures against German tanks later in the war. For example, the book *Band of Brothers* describes a battle between two GIs armed with a bazooka and some German tanks in the hedgerow country of France after the Normandy invasion.

...(Lt.) Welsh told Pvt. John McGrath to bring his bazooka and come on. They raced out into the open field, crouched down, armed the bazooka, and Welsh told McGrath to fire. The shot hit the turret but bounced off.

Another similar episode is recorded in the book *The GIs War.*

The bazookamen hopped over another hedgerow about 30 yards from the tank and began to fire on it. They fired three times and hit the tank three times. But the first two shells bounced off its armor.

The German tanks in use at this time were heavily armored on the front, sides and turret. The most vulnerable parts of the tanks were the rear and the bottom, which were both less heavily armored. Even when a bazooka rocket was unable to penetrate a tank's armor, it could often knock off a tread or otherwise disable a tank without necessarily destroying it. The two soldiers mentioned above, Lt. Welsh and Pvt. McGrath, were eventually able to knock out the tank as it climbed over a hedgerow.

...he (McGrath) held his place, took careful aim at the tank, which was at the apex of its climb, cannon pointing skyward, the huge vehicle just about to tip forward as it broke through, and fired. He hit exactly where he wanted, the unarmored belly of the tank, and it exploded in a great burst of flame and fire.

The bazooka was also used for duty other than knocking out enemy tanks. One Ordnance Department document relates that

An interesting discovery made in Sicily was that the bazooka was effective as a morale weapon against enemy soldiers in strongpoints and machine gun nests. It is no longer thought of as only an antitank weapon, and in its new role was

so well liked by the troops that they disregarded the restrictions on its use.

General G.M Barnes, in his book *Weapons of World War II,* stated,

This weapon (the bazooka) was enthusiastically received by the troops. It later proved to be of inestimable value in every theater of operations, not only for use against tanks, but as a short-range anti-pillbox and anti-personnel weapon. Called by the Germans the 'shoulder 75,' it was used to destroy machine gun and mortar nests. Where heavy bunker walls could not be penetrated, fire directed close to slits would stun occupants with concussion, and the fragmentation effect of the high-explosive rocket head proved effective against personnel.

When attacking Japanese emplacements such as bunkers and pillboxes in the Pacific, the Marines devised "pin up teams" consisting of a bazooka and two BARs to knock out these fortified installations. One World War II Marine Corps report states that "..the Japanese...continued to harass the Marines from cleverly hidden caves and gullies...bazooka shells accurately fired into such defensive positions usually eliminated this resistance in short order."

In addition to the shaped charge antitank rocket, an unusual "piggy back" rocket with two fragmentation grenades was produced for use with the bazooka. These were intended for antipersonnel use but were apparently procured and issued in very limited numbers.

Despite the problems, the bazooka was nevertheless a very important infantry weapon for the American military. It was arguably the best weapon of its type fielded in quantity by any nation with the exception of some of the German designs. This is confirmed by Ordnance documents that quote a report from General Eisenhower to General Marshall comparing American weapons to their German counterparts.

...only the German bazooka may be considered superior to an item of ours.

General Barnes remarked that "The greatest compliment to the bazooka, however, was that paid by the Germans, who copied the design."

The shortcomings of the 2.36" bazooka, particularly against German armor, pointed out the need for a larger and more powerful model. In October of 1944, official development was begun on a 3.5" rocket launcher similar to the 2.36" M9A1 except for a larger rocket. This weapon was standardized several months after the end of World War II as the M20. None saw use during the war but it was the standard post-WWII bazooka. The M9A1 and other 2.36" models were withdrawn from service and destroyed or given away to friendly nations through various military assistance programs. Some 2.36" bazookas were used in the early days of the Korean War, but these were soon replaced by the later 3.5" bazookas.

The bazooka arrived on the scene at exactly the right time to provide invaluable service to the American infantry. The detractors of the weapon should remember that if there hadn't been any bazookas, many GIs would have had no effective antitank weapon available. This is well stated in the book *There's a War to Be Won* when the author concludes that

It (the bazooka) had its flaws and limitations, to be sure, but it was a remarkable weapon for all that. Skinner and Uhl had done what hardly seemed possible—they had put a man on an equal footing with a tank.

General Levin H. Campbell, Jr., Chief of Army Ordnance during World War II, made a similar statement at the time of the bazooka's adoption in the

A Marine bazooka team on Saipan. Note the cardboard rocket storage containers at right. (U.S. Navy)

spring of 1942.

The bazooka is so simple and yet so powerful that a foot soldier using it can stand his ground with the certain knowledge that he is the master of any tank which may attack him.

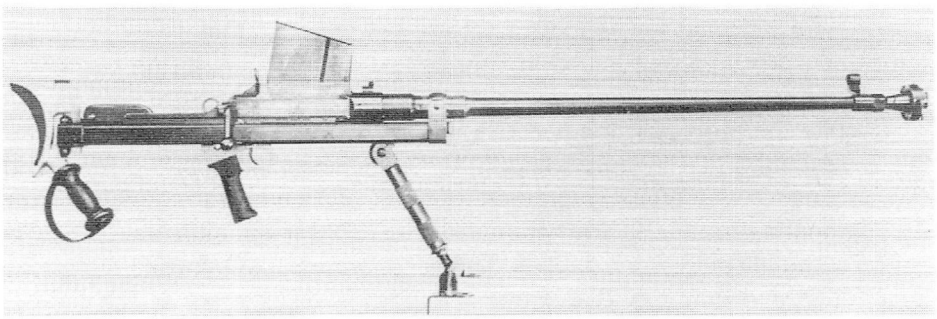
While General Campbell's declaration may have proven to contain a bit of hyperbole, it nevertheless was fundamentally true. While the technology of antitank weapons soon passed the bazooka by, it still holds a place in the history of infantry weapons as the first truly effective modern antitank weapon capable of being transported and operated by one man. Even with whatever shortcomings it may have had, the weapon's service to the American GI of World War II cannot be over-emphasized. The bazooka's place in the history of U.S. weapons of the Second World War should not be forgotten.

Boys .55 Caliber Antitank Rifle

While the task of stopping enemy tanks fell to the bazooka and antitank rifle grenade (discussed later), a limited number of Boys antitank rifles were obtained by the United States early in World War II. This .55 caliber weapon had been adopted by the British in late 1937 and was produced until 1942 in Great Britain by Birmingham Small Arms (BSA) and Enfield and in Canada by Inglis. In British service, the Boys rifle was intended to be the basic antitank weapon for a platoon. It had a bolt action that fed from a detachable five round magazine. The weapon weighed about 36 pounds (unloaded). The barrel was 36" long and the entire rifle was 63.5 inches in length. The Boys antitank rifle had a muzzle velocity of 3,000 fps and an effective range of 2,000 yards.

The Boys rifle performed adequately for the British in the Pacific against the lightly armored Japanese tanks but failed miserably when used against most of the German armor. The Boys was replaced by the "Projector, Infantry, Anti-Tank" (PIAT) in British service soon after 1942. A relatively small number of Boys antitank rifles was procured early in World War II by the United States Marine Corps for the Raiders and by the U.S. Army for some Ranger units. Each Marine Raider company was issued one of the weapons and each Army Ranger Battalion was issued three. Since the Raiders and Rangers were, in part, formed as mobile hit-and-run units, a relatively light and portable antitank weapon was desired. As the bazooka was not yet in service at the beginning of the war, the only available weapon that appeared to meet their needs was the Boys antitank rifle.

The Marine Raiders carried Boys antitank rifles on the Makin Island raid and used the weapons to knock out two Japanese seaplanes anchored in the lagoon. It has also been confirmed that the Raiders used Boys rifles on Guadalcanal and New Georgia. The Marines dubbed the weapons "Elephant Guns." Despite the limited but successful use of the Boys rifles on Makin, the weapon was apparently not held in high esteem by



(top) .55 Caliber Boys Antitank Rifle. This British-designed weapon saw limited use with U.S. Marine Raiders and some Army Ranger units early in World War II. It was eventually replaced in U.S. service by the bazooka. (Military Small Arms of the 20th Century) **(bottom) A Marine Raider patrol near Enogai Point, New Georgia, August, 1943. The Raider third from the right is carrying a .55 caliber Boys Antitank Rifle over his shoulder.** (Our Kind of War)

the Marine Corps. The 1943 Report of USMC infantry weapons used in combat by a Raider battalion on New Georgia contained the following succinct passage: "Rifle, Boys, AT, Cal. 55: of absolutely no use in jungle warfare." Apparently the heavy weight of the Boys rifle and the scarcity of suitable targets in the Pacific were liabilities too great to overlook. Not many Marines would have relished the idea of lugging a bolt action rifle weighing almost 40 pounds through the jungle with little prospect of using it.

The U.S. converted a few Boys rifles to .50 caliber for testing and evaluation purposes in 1942, but the weapon was never standardized by our armed forces. Little has been recorded regarding the use of the Boys rifles by the Rangers. As was the case with the Marine Raiders, the use of the Boys AT rifles by the Rangers was limited and the weapons were soon withdrawn when bazookas became available in sufficient numbers. Not many people today are aware of the issue of the Boys antitank rifles to the Rangers and Raiders and it is an almost forgotten U.S. infantry weapon of World War II.

Collector Notes

THE BAZOOKA

Collector interest in the bazooka has been rather limited for a number of reasons. As compared to machine guns, very few bazookas have survived and are properly registered to allow for civilian ownership. All variants of the bazooka are classified as Destructive Devices by the Bureau of Alcohol, Tobacco and Firearms. As such, they are subject to the same type of restrictions as fully automatic firearms including registration and payment of a $200 transfer tax for non-dealers even though they are also classed as Curios and Relics.

In addition to the registration requirements for bazookas, any live rockets are also subject to the same regulations and restrictions. Very few live bazooka rockets, including practice rounds, have survived. Even if a live bazooka rocket was available, its use after 45 or 50 years would not be recommended, and the rocket motor would probably not be operable in any event. Inert dummy rockets are relatively common but, of course, these cannot be fired. Therefore, unlike machine guns that are often fired by their owners, this is virtually impossible for bazooka collectors.

Finding a live, registered bazooka is not a particularly easy task today. As stated, few have survived and fewer still have been properly registered to allow for ownership transfer. A genuine, operable WWII-vintage bazooka usually brings a handsome price on today's collector market.

If a collector desires a representative example of a World War II bazooka, it is much easier and much cheaper to purchase one of the demilled bazookas. Once relatively uncommon, fairly large numbers of these have appeared on the market in the past few years. Most of these bazookas are later World War II production and were brought back into this country after being purchased from foreign governments that were given the weapons after the war under various military assistance programs. Since the current federal law does not allow for the importation and/or registration of such weapons, it was necessary to render the bazookas inoperable before they could be imported and sold in the United States. This process, known as demilling, typically consists of cutting two large holes in both sections of the tube and welding metal bars inside the tube. Thus altered, the bazooka is incapable of being used as a weapon and is removed from being classified as a Destructive Device or even a firearm. Demilled bazookas can be freely sold with no Federal restrictions. The majority of the demilled bazookas seen for sale today are the M9A1 variants, although a few of the earlier variants may be found. Demilled post-WWII 3.5" bazookas are also around.

Some high quality reproduction M1 bazookas have been produced in the past few years as well. These are excellent copies of the rare and desirable early World War II bazooka, but they are not capable of being fired and their sale is not restricted by any Federal laws. Such replicas typically sell for a bit more than the demilled bazookas.

The early metal bar-type bazooka sights are less commonly found than the later optical ring sights. The manufacturer's initials (typically "GE") and the serial number are marked on the right rear of the tube between the contact box or spring contacts (depending on model) and the rear of the launcher. The M9A1 variant is marked with the model designation on both sections of the tube near the coupling section. All bazookas were finished with green (O.D.) paint.

Several interesting accessory items were produced and are generally available to the collector today. The inert dummy rockets alluded to previously are still around in fair numbers although the unique (and seldom used) "piggy back" fragmentation grenade rocket is quite difficult to find. Other items available include the protective face mask and rocket carrying pouches. The web pouches that hold the two piece M9 and M9A1 bazookas are also around but are rather scarce. Both olive green and camouflage variants may be seen.

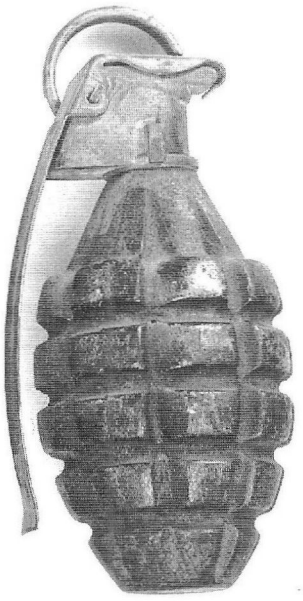
The bazooka's achievements are often overlooked when the great weapons of World War II are discussed. As we have seen, it was far from perfect, but at the time of its initial adoption and for most of the war, it was the best weapon of its type available to any soldier of any country. As correctly summed up by the *Army* magazine,

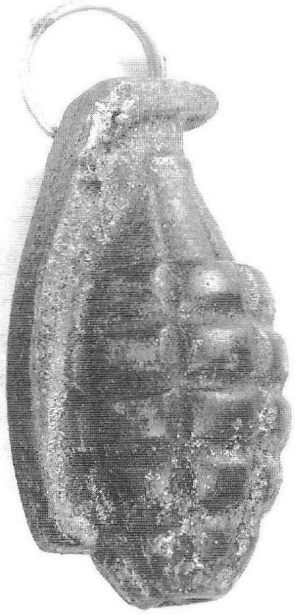
Epitomizing the successful combination of the essential ingredients of a great infantry weapon, simplicity and firepower, the bazooka has been hailed as one of the major developments of World War II.

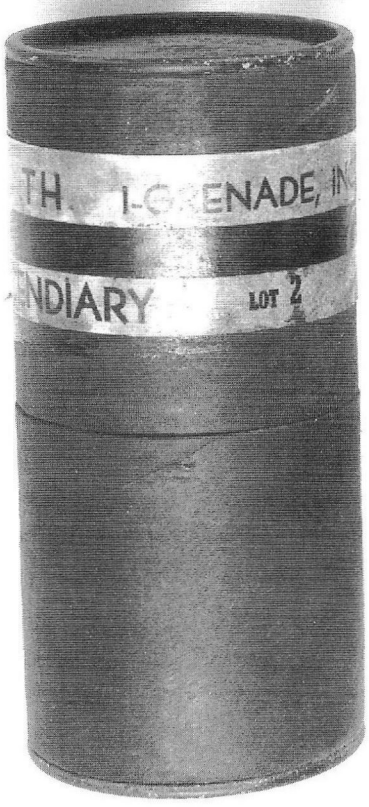
BOYS ANTITANK RIFLE

It is believed that the Boys rifles procured by the Army and Marines were acquired from Inglis in Canada. Some of the Boys rifles are marked "United States Property". Although it is speculation, one would assume that the weapons so marked would have been the Boys rifles that saw U.S. service.

In its original configuration, the Boys antitank rifle is classified as a Destructive Device since its bore is larger than .50 caliber which makes legal possession and ownership subject to Federal restrictions. However, a number of Boys rifles have been rebarrelled to .50 caliber, which effectively removes the Destructive Device status and enables such modified Boys rifles to be owned with no more restrictions (at least on the Federal level) than any other bolt action rifle.



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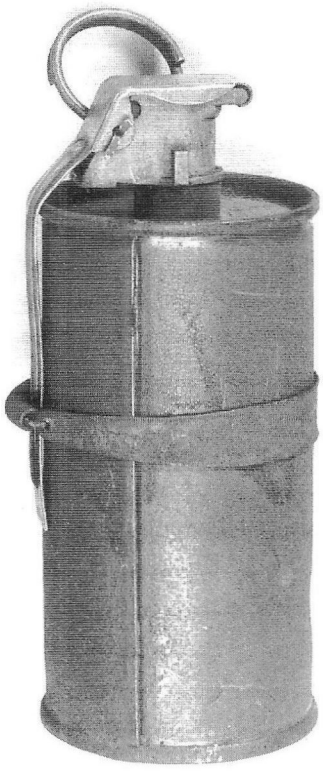
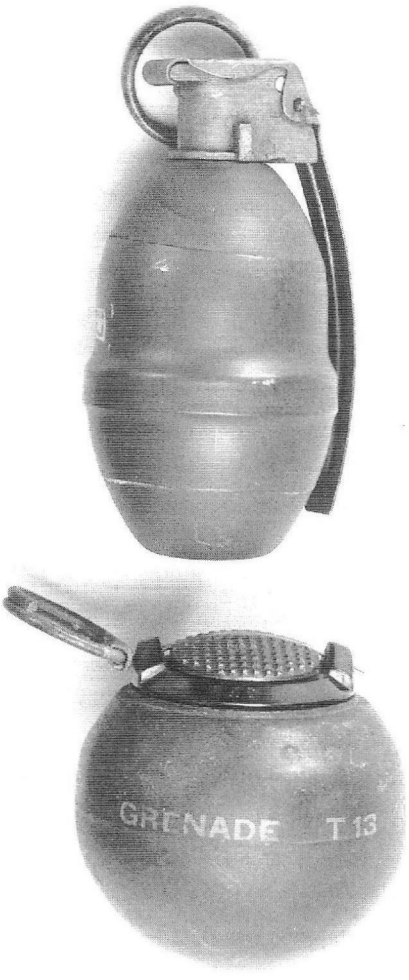



GRENADE T13

Grenades and Grenade Launchers

The importance of the grenade is often overlooked today when considering the infantry weapons of the Second World War. Most of the weapons examined in these pages were relatively modern inventions compared to the grenade. For example, the bazooka was state of the art at the time of its adoption in mid-1942, and the various WWII machine guns were the products of relatively recent technology. On the other hand, the grenade was used in warfare as early as the 1400s. The term "grenade" came into use during the reign of Francis I of France in the early 16th century. The name was used due to the early grenade's supposed resemblance to a pomegranate, *grenate* in French. These early hand-held bombs were thrown by specially selected and trained soldiers, *grenadiers*. Grenades were often an important part of the pre-19th century armies but as the range and firepower of guns increased, grenades became less useful. The improved accuracy of firearms made it much more difficult for a grenadier to get close enough to his target to throw a grenade. Grenades were used to a limited extent during the American Civil War and other actions, such as the siege of Port Arthur during the Russo-Japanese War of 1905. However, from the time of the Franco-Prussian War of 1870 until the First World War, the grenade saw very limited use as a weapon of war.

The re-emergence of the grenade was due in large measure to the nature of World War I. The widespread use of trench warfare mitigated to some extent the usefulness of machine guns and other modern firearms. While machine guns were used with deadly effectiveness when repelling assaults, they were of little use against the enemy in their trenches and became essentially defensive weapons.

However, the curved trajectories of grenades and mortars made these weapons useful for offensive purposes. A grenade lobbed into a trench could do much damage to its occupants who would have been safe from flat-trajectory weapons, such as rifles and machine guns. Thus, World War I gave new life to the grenade as a tool of modern warfare.

Two basic types of grenades were used in World War I and World War II. These are the hand grenade and the rifle grenade. As their names imply, the former was generally thrown by hand while the latter was launched from a rifle. The range of the hand grenade was determined by the strength of its thrower, and about 35 to 40 yards was considered the maximum. The rifle grenade had an effective maximum range of approximately 200 yards.

The United States did very little developmental work on a modern grenade prior to World War I. When America entered the war, the grenades of our French and British allies were purchased to equip our forces. The U.S. Army eventually adopted a hand grenade based on the standard British grenade, the Mills Bomb. The United States also adopted the British-developed Babbit rifle grenade. This grenade had an attached stem that fit into the bore of the service rifle and was launched by means of a blank type cartridge. However, due to the bulky nature of the long stem and the damage it caused to the bore of the rifle, the Babbit rifle grenade saw very limited use. The French-designed VB (Vivien-Bessiere) was adopted to replace the unsatisfactory Babbit grenade.

***Facing page*— World War II U.S. hand grenades. (top row, left to right) Mk I Offensive Hand Grenade (cardboard body); Mk II Fragmentation Grenade; Mk 1A1 Dummy Training Grenade. (bottom row, left to right) World War II hand grenade container (cardboard); TH 14 Incendiary Grenade; Mk I Illuminating Grenade; T13 Impact Hand Grenade.** (Hayes Otoupalik Collection)

WWII Hand Grenades

America entered the Second World War armed with hand grenades very similar to those used in World War I. There were five basic classifications of hand grenades used during World War II. War Department documents contain these descriptions of the five types of hand grenades.

(1) ***Fragmentation grenades.*** *These contain an explosive charge in a metal body and are designed to break up into fragments to inflict casualties upon the action of the bursting charge. They have a killing radius of 5 to 10 yards and stray fragments are dangerous up to 50 or more yards.*

(2) ***Offensive grenades.*** *These contain an explosive charge in a paper body and are designed for demolition effect and to stun the enemy in enclosed places, so that the thrower can charge while the enemy is in a dazed condition.*

(3) ***Chemical grenades.*** *These contain a chemical agent designed to produce a toxic or irritating effect, a casualty effect, a screening or signal smoke, an incendiary action or combinations of these.*

(4) ***Practice grenades.*** *These contain a reduced charge for safe use in training.*

(5) ***Training grenades.*** *These contain no explosive charge or chemical and are made for use in throwing practice.*

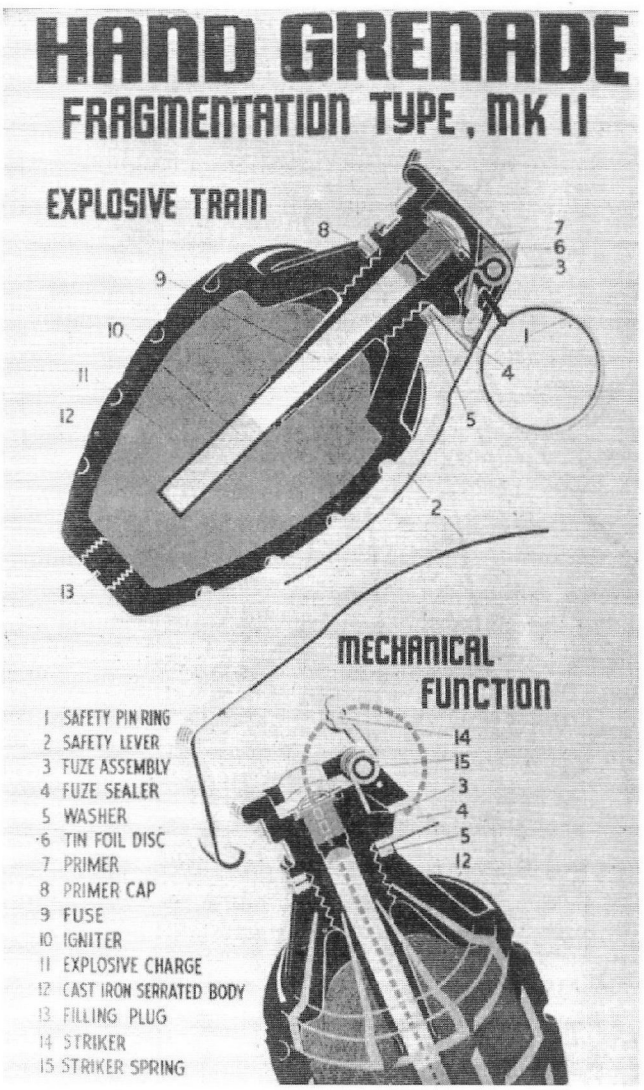
Each type of grenade had a specific purpose for which they were designed, and each differed somewhat in configuration and appearance. The chief parts of the hand grenade are the fuze, the filler and the body. Probably the most critical component of the hand grenade was the fuze, which was the mechanism that caused it to explode. Most American hand grenade fuzes of World War II were of the automatic/time type. This meant that the grenade was exploded after a specific lapse of time, not on impact, and that the fuze began its timing process automatically as the grenade left the hand.

The American hand grenades had a safety lever that was secured by a safety pin. Once the pin was removed, the lever was held in place with the hand and when thrown, the lever was released. This caused an internal striker to set off the primer, which in turn ignited the time fuze. After a pre-set period of time, the grenade exploded. The typical time delay for American hand grenades of World War II was four to five seconds from the time the safety lever was released, although some specialized grenades had a shorter time fuze.

There were two basic types of time fuzes used in World War II hand grenades: the detonating fuze and the igniting fuze. A detonating fuze contained a small amount of explosive material that set off the main explosive charge contained in the grenade's body. The igniting fuze contained a burning compound that worked by igniting (rather than exploding) the main explosive filler of the grenade.

Fragmentation grenade

The most widely used U.S. fragmentation hand grenade of World War II was the Mark II. The Mark II was an improved version of the earlier Mark I and saw



WWII U.S. Army training chart, "Nomenclature and Functioning of the Hand Grenade." (U.S. Army)

widespread use throughout the war. Some of the WWI-type pineapple hand grenades as well as some of the Mark I grenades were used in the early days of World War II.

The Mark II weighed approximately 21 ounces. The Mark II grenade was standardized with a TNT filler, but this explosive was in short supply. Early production Mark II grenades had an explosive filler compound consisting of 25 percent nitrostarch, 34 percent ammonium nitrate and 40 percent sodium nitrate. As supplies of TNT became more abundant, this explosive was substituted for the nitrostarch compound.

The standard fuze used with the Mark II grenade for most of the war was the M64A. While this fuze was generally reliable, it produced a flash, a report, some smoke and sparks as the grenade was thrown; this could reveal the location of the thrower. The improved M204 fuze eliminated these problems and came into service in 1944 for use with the Mark II grenade.

The Mark II's body was constructed of cast iron with serrations designed to produce more lethal fragments upon detonation. The Mark II was painted OD (olive drab), and later versions had two narrow yellow bands painted around them. The grenade's range was determined by the strength and experience of the thrower but 35 to 40 yards was considered the maximum range. As stated above, some fragments could be dangerous up to 50 yards, so soldiers were trained to keep down until their grenade exploded. The time delay was from 4.0 to 4.8 seconds.

While the Mark II grenade outwardly resembled the pineapple grenade of the First World War, its performance was markedly increased due to the utilization of improved high explosive fillers. As an illustration of this dramatic improvement, the World War I grenade produced about 50 lethal fragments, while the Mark II grenade had about 1,000!

An infantryman of the Army's 1st Division crossing the Rhine, 1945. He has two Mk. II fragmentation hand grenades secured by strings. (U.S. Army)

A later variant of the Mark II which saw use late in World War II was the Mark IIA1. This grenade was very similar to the Mark II and was fitted with the M204 fuze and later the M10A3. The Mark IIA1 differed externally from the Mark I in having only one narrow yellow band painted around it rather than two. Its function and utility were identical to the Mark II.

The Mark II and Mark IIA1 hand grenades were reliable weapons and malfunctions were uncommon. The reliability of the Mark II is confirmed in the 1943 Marine Corps "Report of Infantry Weapons in Combat." The section of this report on the hand grenade was favorable and quite succinct.

Grenade, Fragmentation, Mk. II. Never failed and has everyone's confidence.

The capability of the American Mark II hand grenade is confirmed in the book *Semper Fi, Mac* in which a Marine who served on Guadalcanal stated that

The Nip grenades were highly explosive and their fragmentations so fine that they covered more ground than ours did. But they didn't have the concentrated devastation of the American grenades.

Col. John George had some interesting and revealing comments in his book *Shots Fired in Anger* about the use of the fragmentation grenade in World War II.

...it was a reliable and powerful instrument; its fuses were very seldom erratic, it was safe to use, and it was of good size and weight for hand-throwing. Once in a great while we would hear of an instantaneous detonation, but not often. Most of our grenade accidents—and there were plenty—were of human rather than mechanical origin. Many were caused by incredible stupidity. Several men on frontline duty went to sleep with grenades clasped "ready" in their hands—with the safety pins pulled; as soon as fingers relaxed in sleep the levers were naturally released and the fateful grenades exploded.

(left) General Matthew Ridgeway, left. Note the Mk II fragmentation grenade. (U.S. Army)

But even with all of the danger involved with their use "pineapples" proved to be an important jungle weapon—especially at night. Most of us carried one or two at all times; using the heavy tape which sealed the cardboard containers to rig the grenades to our belts or pack straps, so that they could be quickly torn off and used. Many of the routine trail details—stretcher bearers, supply-carrying parties, anti-sniper patrols—-carried grenades as almost basic weapons. Anything suspicious in the brush would be checked and blasted if it looked like enemy. Sounds at night were given the same attention. Of course, grenade throwing at night can be overdone, and it frequently was. There were too many doughboys who tried to assure their own safety at night by keeping up a constant barrage of grenade explosions in front of their positions. In extreme cases this habit would be incurable and grenades had to be taken away completely from a few of the more rattled characters.

The Mark II fragmentation grenades saw use in a wide variety of roles during the war. A number of Army and Marine Corps documents relate the effec-

Two views of the World War II issue three-pocket hand grenade pouch. The pouch did not see extremely widespread use during the war. (U.S. Army)

tiveness of hand grenades for various types of combat applications. One Marine Corps report states that "In attacking enemy emplacements, whether concrete bunkers or underground spider webs, flamethrowers, demolitions, and hand grenades proved most deadly."

While not specifically designed to do so, there were some instances of American troops knocking out or disabling enemy tanks with hand grenades. This was usually accomplished by placing a grenade underneath or on top of a tank tread or by dropping a grenade down an open hatch.

Other Hand Grenades

While the Mark II fragmentation grenade was, by far, the most widely used and most effective of the World War II American hand grenades, other types were issued as well. These were generally used for specialized purposes and their issue was not nearly as widespread as that of the Mark II.

Offensive Hand Grenade

One relatively little known type of hand grenade used in World War II was the Mark III and Mark IIIA1 Offensive Hand Grenade. These grenades were intended to produce a concussive effect in enclosed spaces such as rooms encountered in house to house fighting, enemy bunkers, etc. Their purpose was to disable or disorient the inhabitants of such structures and to cause a demolition effect when possible. The grenades did not produce the shrapnel fragments of the fragmentation grenade due to their construction.

The Mark III/A1 weighed about 14 ounces and was constructed of a pressed fiber body with sheet metal ends filled with TNT. It is reported in government documents that early variants had fuzes that ignited on impact but these were hazardous to handle and store. Later versions used the same type of time delay detonating fuze as the Mark II fragmentation hand grenade. The body was painted yellow and had the type, model and lot number stenciled on the side in black ink.

The Mark III and Mark IIIA1 offensive hand grenades saw limited use during World War II and problems were sometimes encountered when they were utilized. The history of Marine Corps operations in World War II contains the following passage regarding these grenades.

Difficulties were encountered with the offensive hand grenade, whose very name was considered a misnomer because of its relative ineffectiveness. The grenade was constructed to detonate on impact, but since it had no fragmentation effect, it was ineffective against material and useful against personnel only to a very limited extent. It was dangerous to handle, and two men of 1/1 had their hands blown off in the act of throwing a grenade of this type.

As stated, later versions of this grenade had time fuzes rather than the dangerous impact type.

T13 "Beano" Fragmentation Hand Grenade

A little-known and seldom used hand grenade was the T13 Beano. This baseball-shaped grenade was developed for use by the OSS for clandestine sabotage and other related uses. The T13 had an inflight arming fuze that was designed to arm itself after the grenade had travelled at least 25 feet; the grenade would explode upon impact. It is believed that the sole producer of the T13 grenade was the Eastman-Kodak Company. Performance of the grenade was very erratic and, like all impact grenades, was inherently dangerous to the user. It has been reported that some T13 grenades were issued to U.S. Army troops during the Normandy Invasion but this has not been positively confirmed.

Incendiary Hand Grenades

Another type of hand grenade which saw fairly limited use during World War II was the incendiary grenade. Several variants of this type of grenade were produced but all had the same general purpose: to cause an incendiary reaction. One grenade of this type that is little known today was the M1 frangible grenade with igniter. This grenade was essentially nothing more than a Molotov Cocktail. A glass bottle was filled with gasoline and alcohol, and a tube of chromic anhydride was attached. When the bottle was thrown against an object (a tank, bunker, etc.), the bottle would break and the gasoline would ignite due to a reaction between the alcohol and the igniter (chromic anhydride), which would in turn ignite the gasoline filler. A later version was the M3 frangible grenade, which could be improvised from virtually any type of bottle. The frangible grenade was developed by the U.S. Army Chemical Warfare Service, but none were issued. As a Chemical Warfare Service document relates,

While this munition (the frangible grenade).. worked satisfactorily, it was dangerous to produce, store and ship. A bottle broken accidentally could start a fire that might destroy a plant, warehouse or ship. No grenades of this type were ever stored or issued to troops and in 1943 the service discarded them.

Improved and less volatile versions of the frangible grenade were developed, and over half a million were

produced. However, all versions were inherently dangerous weapons to use and none are believed to have been issued. The need for such weapons was eliminated as other more reliable and less hazardous antitank weapons, such as bazookas and antitank rifle grenades, became available.

Other more effective types of incendiary hand grenades were produced and issued during World War II. The standard incendiary hand grenade of the war was the AN-M14. This grenade had a cylindrical sheet metal body filled with thermite. The Ordnance Department designed the body of the grenade while the Chemical Warfare service developed the thermite filler.

Production of the AN-M14 incendiary grenade began in 1942 and sufficient supplies were on hand by late 1943 to discontinue their production since relatively few of the grenades were used. A Chemical Warfare Service document stated that "While the AN-M14 was one of the grenades least employed, it served a useful purpose in special situations." These special situations included igniting gasoline poured into enemy caves and other positions and for signalling in the dark. World War II Army training films demonstrated the use of the incendiary grenade for destroying captured enemy artillery pieces by igniting a grenade in the breech mechanism, which fused the breech block permanently closed and rendered the piece inoperable.

The AN-14 grenade can be identified because the smooth sheet metal body was painted blue gray and had "TH INCENDIARY", the lot number and one band stenciled in purple ink. The grenade weighed 32 ounces and was equipped with either the M200A1 or M200A2 igniting fuze with a two second time delay.

White Phosphorus

Another little known type of hand grenade used in World War II was the white phosphorus grenade. While the chief purpose of the white phosphorus grenade was as a smoke producing agent, it was also effective as a weapon. As stated in Chemical Warfare Service reports,

The material WP (white phosphorus) was unsurpassed as a smoke producer and it also paid dividends in other ways. Burning phosphorus wounded enemy soldiers just as readily as rifle bullets and shell fragments. Fragments of burning phosphorus streaking through the air were also hard on enemy morale.

The standard American white phosphorus hand grenade of World War II was the M15 WP. This grenade was constructed of a smooth sheet metal cylindrical container, much like the AN-M14 incendiary grenade, and filled with white phosphorus. The M15 weighed about 31 ounces and used the M6A3 detonating fuze with a 4.0-4.8 second time delay. The grenade was painted blue gray with "WP SMOKE", and a single band was stenciled in yellow on the body. Its burst radius was approximately 25 yards and it burned for 50 to 60 seconds. The official uses of the M15 grenade were listed as "screening, casualty, harassing."

As stated, the M15 white phosphorus grenades were not used as widely as the Mark II fragmentation grenades, but they were of value in many instances. Chemical Warfare Services documents indicate that in May of 1943, "All the chemical supply officers reported urgent requests for unavailable white phosphorus grenades." Another CWS document covering the Italian campaign reveals that

The theater CWS acquired some white phosphorus grenades in the fall of 1943, and a sufficient stock was built up by December 1943. Although a total of 269,639 white phosphorus grenades was used in combat in the theater, this munition would probably have been more extensively employed had combat soldiers become acquainted with it during the initial campaigns.

The M15 grenade saw rather wide issue in all theaters of the war and proved to be a useful weapon for a number of uses.

Smoke Grenades

Although classifying the various types of smoke grenades as weapons may be a bit of a stretch, such items were useful to the infantry for certain applications.

Colored Smoke Grenades

The most widely used type of signal munitions of World War II were the smoke hand grenades. Development of these items began in September of 1942 upon the request of Army Ground Forces as a means to identify troop positions and other similar uses. Chemical Warfare Service Engineers developed the prototype colored smoke grenades from the M7 chemical warfare grenade. It has been reported that CWS representatives contacted Hollywood special effects people to assist in this project due to their experience with the use of colored smoke in movies.

The first type was standardized in April of 1943 as the M16. This grenade was made in six colors: red, orange, violet, black, yellow and green. When ignited, it produced a cloud of smoke for about two minutes. While this grenade worked reasonably well, a thicker

(right) Marines battling the Japanese on "Suicide Ridge," Peleliu. The Marine in the center is preparing to throw an incendiary hand grenade. Note the M7 rifle grenade launcher on the M1 Garand at right. (USMC)

(left) U.S. Marine throwing a white phosphorus (WP) hand grenade into a Japanese cave on Saipan, July 12, 1944. (U.S. Navy)

cloud of smoke was desired, and an improved version was developed and adopted as the M18. The M18 gave off a more dense volume of smoke than did the M16, although its duration was only for about one minute. Eight colors were originally anticipated to be produced for the M18, but it was decided to reduce the number of colors to four: red, green, yellow and violet. The M18 had a smooth sheet metal cylindrical body with either an M200A1 or M200A2 igniting fuze. It weighed about 17 ounces. The body was painted blue gray and had the lot number, model and one band painted in yellow. The top of the grenade was painted to indicate the color of the smoke.

Two other types of colored smoke hand grenades were used during World War II, but they were intended primarily for screening troop movements rather than for signalling purposes. One type, the AN-M2 hand grenade, produced a large volume of red smoke for about two and a half minutes. It was very similar in appearance and function to the M18, including the same type of smooth cylindrical blue gray metal body and igniting fuze. The AN-M2 was stencilled in yellow on the body "SMOKE RED", the date of filling and one band. Another virtually identical smoke hand grenade was the "HC AN-M8", which produced white smoke. Externally, it differed from the AN-M2 by the markings on the body "HC SMOKE", the lot number and one band stencilled in yellow.

The colored smoke grenades were widely used during the war for a number of purposes, including marking positions for close air support and marking targets for artillery fire. Other uses included signalling troops and communicating with tanks. Chemical Warfare Service documents reveal that over five million such smoke grenades were made from 1942 through 1945.

Irritant Grenades

One little known and seldom used hand grenade type was the "Gas, Irritant". This type of munition is more commonly known as a tear gas grenade and its function was officially listed as "harassment." Its

intended use was to incapacitate the enemy by strong irritating fumes. Two basic types were fielded in World War II. The first type was the M6, which had a smooth cylindrical sheet metal body and an M200A1 or M200A2 igniting fuze. The M6 was filled with the chemical CN-DM, which emitted noxious fumes for up to 60 seconds. The grenade was painted blue gray and had "CN-DM GAS" and a single band painted in red on the body.

The second variant was the M7 (and later M7A1) which was virtually identical to the M6 except the filler was pure CN gas rather than the CN-DM mixture. It was marked on the body in red "CN GAS" and had a single red band. Its utility and function was the same as the M6.

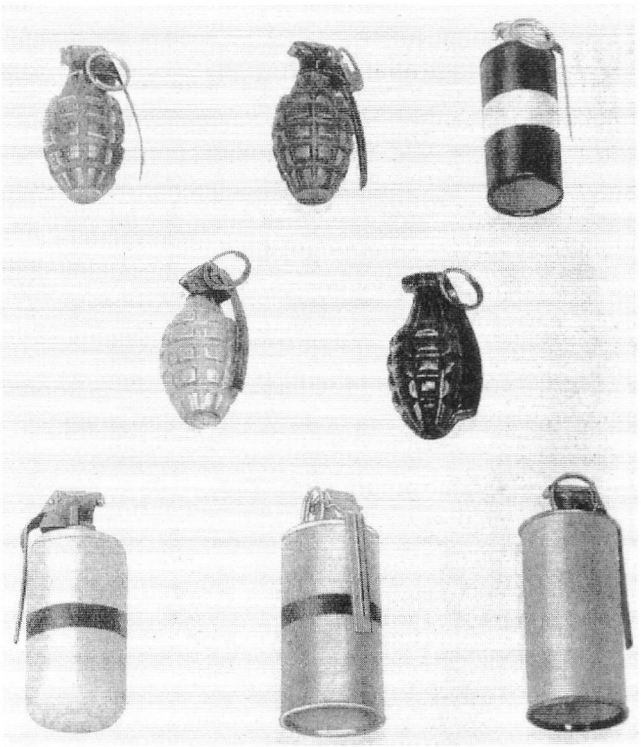
While the M6 and M7 gas grenades saw some use in persuading reluctant enemy soldiers trapped in bunkers, caves or buildings to surrender, their use was limited. More often, when the enemy refused requests to surrender, fragmentation grenades and white phosphorus hand grenades were used with much more permanent results.

Training and Practice Grenades

Since hand grenades were quite dangerous weapons to untrained users, much emphasis was placed on safe training techniques. Obviously, giving a bunch of raw recruits live Mark II fragmentation hand grenades on a training range would not be a wise thing to do. The Mark II and Mark IIA1 training grenades were developed to train troops in the proper techniques of hand grenade use. The Mark II and Mark IIA1 training grenades were of the same configuration, size and weight as the standard Mark II fragmentation hand grenade. The two types of training grenades were identical except that the Mark II used the M10A2 igniting fuze, which had a time delay of 4.3 to 5.5 seconds, while the Mark IIA1 used the M10A3 fuze, which had a time delay of 4.0 to 4.8 seconds (the same as the Mark II fragmentation grenade). However, rather than containing the highly explosive TNT filler of the Mark II fragmentation grenade, the Mark II and Mark IIA1 training grenades contained a reduced charge of black powder. Rather than exploding when detonated, the training grenades simply blew out a cork plug. This allowed for the smoke released from the small charge of black powder to simulate a grenade explosion but posed little risk to the user. Many of these grenades were painted blue to help distinguish them from the fragmentation grenades.

The Mark 1A1 training grenade was used for learning basic throwing techniques and other fundamental training uses. Unlike the Mark II and Mark IIA1 practice grenades, the training grenade had no fuze or filler. It was simply a cast iron dummy with the same configuration and weight as the Mark II fragmentation grenade. It had a removable safety pin but otherwise was of one-piece solid construction. It could obviously be used for training green recruits with no fear of injury due to carelessness or inexperience.

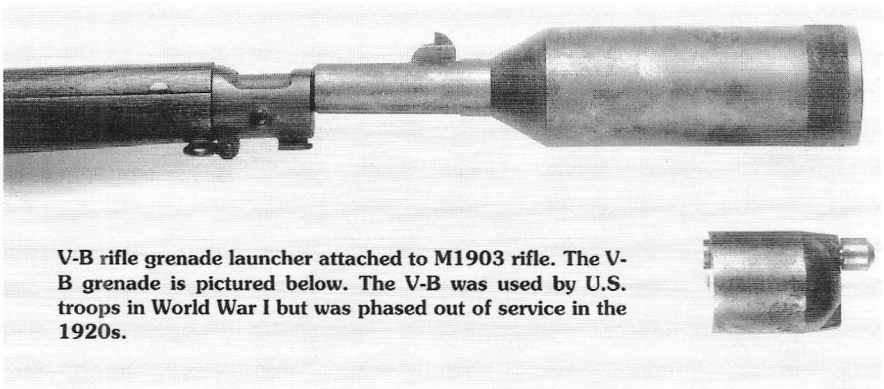
Even though overshadowed by such weapons as rifles and machine guns, the hand grenade was an indispensable part of the GI's arsenal during World War II. As correctly stated in the book *Shots Fired in Anger,* "The grenade is another weapon which is seldom recognized as truly important until in actual combat use." How true!



U.S. Army photograph of World War II Hand Grenades (left to right, from top).

Mk.II Fragmentation
Mk.IIA1 Fragmentation
Mk.IIIA1 Offensive
Mk.II Practice
Mk.IA1 Training
M15 WP Smoke
M6 Gas, CN-OM Irritant
M18 Colored Smoke

Rifle Grenade Launchers



V-B rifle grenade launcher attached to M1903 rifle. The V-B grenade is pictured below. The V-B was used by U.S. troops in World War I but was phased out of service in the 1920s.

While the hand grenade may be overlooked by many people today as an important infantry weapon of World War II, the rifle grenade is often totally forgotten. Very little has been written regarding rifle grenades and their launchers, although these were widely used and very interesting weapons.

As mentioned previously, the First World War saw the development and utilization of the first generation of modern rifle grenades. The French-designed V-B rifle grenade launcher was eventually standardized for use with both the M1903 and M1917 rifles, and large numbers of the launchers and grenades were produced. The V-B utilized a cup type launcher (also known as a tromblon) fitted to the end of the rifle. The V-B grenade had a hole through the middle which allowed the use of the standard M1906 rifle ammunition. The bullet passed through the hole, and the gas generated by firing propelled the grenade to a maximum range of about 200 yards. V-B launchers for both the M1903 and M1917 rifles were manufactured during World War I and were essentially identical except for slight dimensional variances due to the different outside diameters of the two barrels. Four slightly different variants were manufactured during the First World War.

While the V-B launcher saw wide use in World War I, a number of problems were encountered. The loose fit between the launcher and rifle often caused inaccuracy and loss of range. Furthermore, some manufacturing errors resulted in a number of V-B grenades having off-center holes and premature explosions could result.

After World War I, the War Department reconsidered the use of rifle grenades, and the Chief of Infantry recommended in 1923 that all rifle grenades be dropped from use. A program to develop a combination hand grenade and rifle grenade was initiated. The use of the V-B rifle grenade was discontinued in 1924. After this time, the use of the V-B launcher was restricted to firing pyrotechnic devices rather than explosive grenades, and its official nomenclature was changed from "Discharger, Grenade" to "Discharger, Pyrotechnic." The V-B launcher was officially declared obsolete in 1928 and work continued at a slow pace during the 1930s for a suitable hand grenade that could also be used as a rifle grenade.

Development on an improved rifle grenade launcher was not aggressively pursued during the early and mid-1930s due to the program underway at this time to adopt a semiautomatic service rifle. Some elements in the American military questioned the need for any type of a rifle grenade launcher and preferred the development of a separate grenade projector weapon instead. The lack of a consensus on the subject resulted in little research and development on either an improved rifle grenade launcher or a grenade projector weapon.

By 1940, the war raging in Europe pointed out the lack of preparedness in many areas of our military arsenal. The lack of a suitable means to propel grenades for longer distances than hand throwing renewed efforts to come up with a solution. As discussed in the section covering the bazooka, the Army adopted the M10 shaped charge antitank grenade but had no suitable means to launch it. The Ordnance Department embarked on the development of a launcher capable of being used with either the M1903 or M1917 rifles to launch the new antitank grenade. Experiments with the M1 rifle had resulted in numerous malfunctions, and it was decided to refine a grenade launcher for the bolt action rifles until such time that a launcher for the Garand could be developed.

M1 and M2 Grenade Launchers

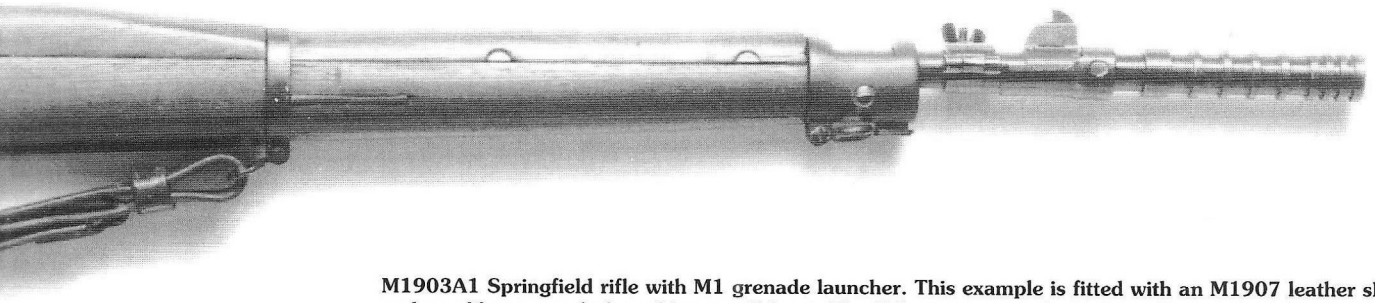
The need for a rifle grenade launcher became more acute as the United States came closer to war. Requirements for a rifle grenade launcher were established even before a design had been fully tested and refined. A grenade launcher was designed for use with the M1903 rifle and given the designation T3. The Knapp-Monarch Company of St. Louis, Missouri

received a contract to manufacture 150,000 launchers. A very similar launcher for the M1917 rifle was designated as the T7. Before production could begin, both designs were refined slightly and re-designated as the T9 and T10 respectively. The T9 launcher for the M1903 rifle was officially standardized as the M1 on September 9, 1941, and the T10 launcher for the M1917 rifle was standardized as the M2 on the same date.

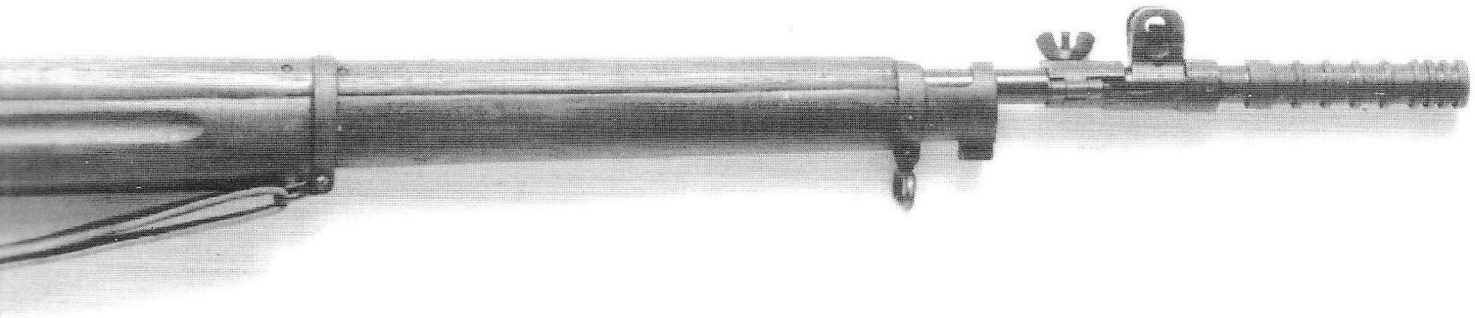
In 1941, Knapp-Monarch Company received a revised contract that called for the manufacture of 100,000 M1 launchers for use with the M1903 rifle. Fifty thousand of the M1 launchers were earmarked for the U.S. Army while the other half of the order was for Defense Aid (Lend-Lease, etc.). The firm was also granted a contract for 100,000 M2 launchers for the M1917 rifle. The bulk of these were intended for use with the large numbers of M1917 rifles sent to Great Britain for Home Guard and related uses, although some were retained for use with the M1917 Enfields in U.S. Army service.

Knapp-Monarch got into production on the launchers in November of 1941, and by the end of December, production had reached the rate of 2,000 launchers per day with maximum production of 3,000 per day, if required. Although Knapp- Monarch could not produce the two types of launchers concurrently, change over time was minimal and required only about half an hour.

The M1 and M2 grenade launchers were very similar but had slight dimensional differences due to the outside diameters of the M1903 and M1917 rifle barrels. The M1 and M2 launchers clamped to the end of the rifle's barrel and were held in place by means of a clamp secured by a wing nut. The tube was approximately 7.125" long and weighed about nine ounces.



M1903A1 Springfield rifle with M1 grenade launcher. This example is fitted with an M1907 leather sling and a rubber grenade launching recoil boot. The '03 saw a great deal of use during World War II as a grenade launching weapon.

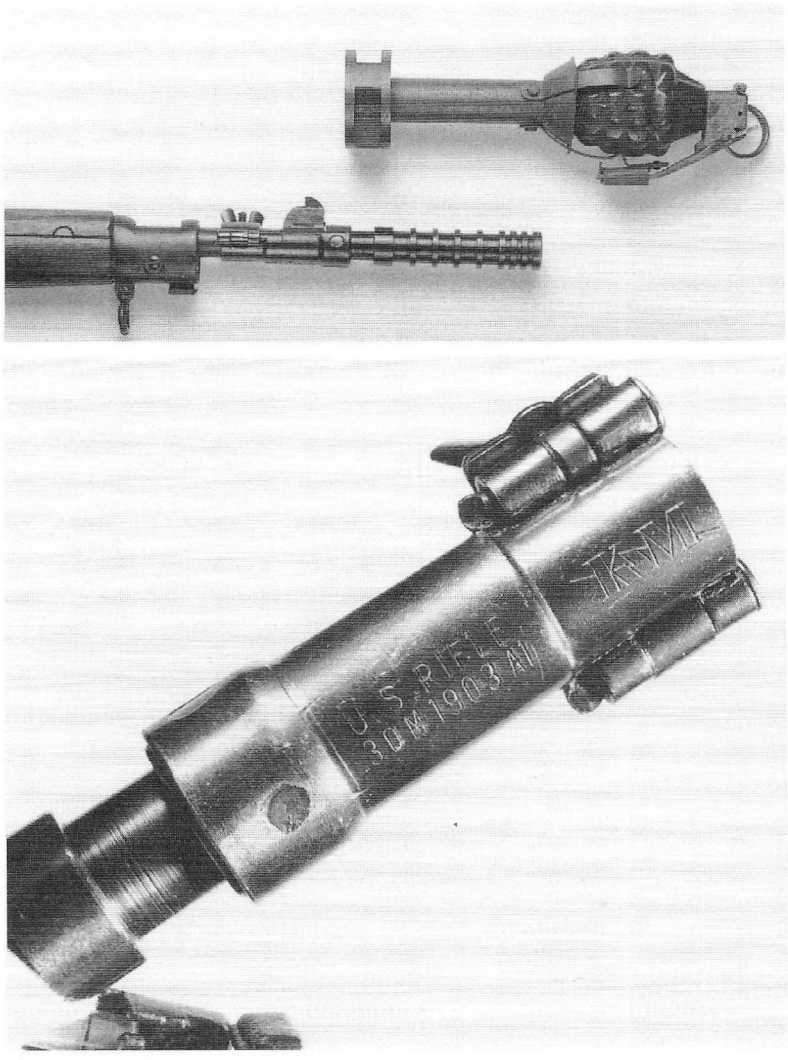


M1917 Enfield rifle with M2 grenade launcher. This rifle also has a web M1 sling and a recoil boot. The M1 and M2 grenade launchers were very similar in design and construction. Few Enfields were employed in front line service during World War II by the U.S. but the rifles saw extensive use as training weapons.

The tube had a series of raised rings on the outside surface which were used in conjunction with the angle of elevation to determine range. With a grenade in place on the tube, the greater the number of rings exposed, the shorter the range. The launchers were finished in blue and marked with the Knapp-Monarch logo ("K-M" with a lightning bolt). Other than the slight dimensional differences, the two types of launchers differed only in the markings. The M1 launcher was marked "U.S. Rifle .30 M1903A1", and the M2 launcher was marked "U.S. Rifle .30 M1917".

Some problems were encountered with early production versions of the M1 and M2 launchers due to the narrow width of the barrel clamp. The narrow clamp allowed for the launcher to slide forward slightly when the rifle was fired. A wider clamp was introduced in July of 1942 that was incorporated into new production launchers and retrofitted to many of the earlier models.

Initial production concentrated on the M2 launcher since this was the type needed by our British allies. This emphasis is illustrated by the production figures for December of 1941 in which 31,980 M2 launchers were made as compared to only 3,520 M1 launchers in the same time period. However, after America's entry into the war, the War Department directed that M1 launchers receive production priority. This shift in production priority is confirmed in the January of 1942 production figures, which show that 63,360 M1 launchers were made, followed by another 55,040 in February. The production for these two months met the U.S. Army's foreseeable needs, and production again shifted back to the M2 launcher in March of 1942, which resulted in completion of most of the original order for 100,000. The final M2 launchers were made in July of 1942 with a total production fig-



(top) M1 launcher on M1903 rifle. A Mark II fragmentation grenade with adapter is shown above.

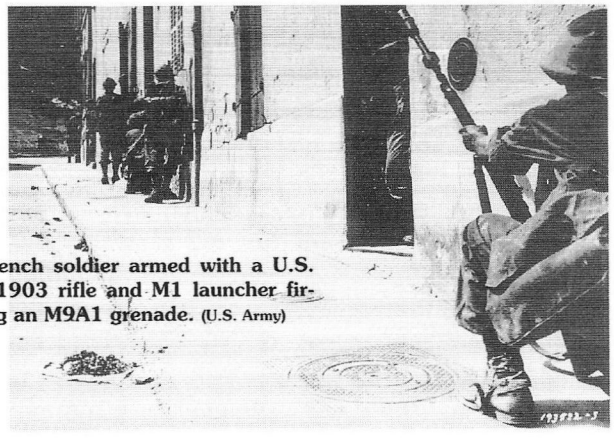
(bottom) Markings on M1 grenade launcher. All of these launchers were made by Knapp-Monarch.

ward.

The situation was entirely different regarding the M1903 rifle and the M1 launcher. Large numbers of '03 rifles equipped with M1 launchers saw combat during World War II and proved to be effective weapons. The authorized allowance for M1 grenade launchers for a Marine Division in 1942 was 456 units. The reasons for such widespread use of the M1903 as a grenade launching platform, particularly in the early to mid-part of the war, were twofold. First, the Garand rifle was in short supply prior to mid to late 1943, so the '03 was often the only rifle available to many troops. Secondly, the problems encountered with developing a satisfactory grenade launcher for the M1 rifle that would allow semiautomatic operation with the launcher in place were never solved during the war. A launcher was eventually adopted for use with the Garand, but the rifle could not fire normally with it in place. For this reason, many soldiers using rifle grenades preferred the '03 because its M1 launcher did not interfere with firing the rifle in a normal manner. Even when sufficient numbers of Garands became available, '03s were still viewed as superior for grenade launching use by many GIs and saw more service for a longer period of time than would otherwise have been expected during the war. The venerable old '03's lease on life during World War II was extended due partly to its widespread employment as a grenade launching weapon. The M1 launcher was declared Limited Standard on December 21, 1944. Unlike the M2 launcher, the M1 was not declared Obsolete and some stayed in service through the end of the war.

ure of 112,327. Production of the M1 grenade launcher continued until May of 1943 with a total of 322,892 M1 launchers having been made. The number of M1 type launchers available was actually a bit larger, as some 39,793 M2 launchers were converted to M1 configuration due to the more pressing need for this type in U.S. service.

Very few M1917 rifles were used by American troops in combat during World War II. The same was true of the M2 grenade launcher. There is little evidence that M2-equipped Enfield rifles saw combat by American (or British, for that matter) troops during the war. Nevertheless, a number of GIs used such weapons for rifle grenade training and practice. The M2 launchers were declared obsolete on September 7, 1944, and were withdrawn from service soon after-



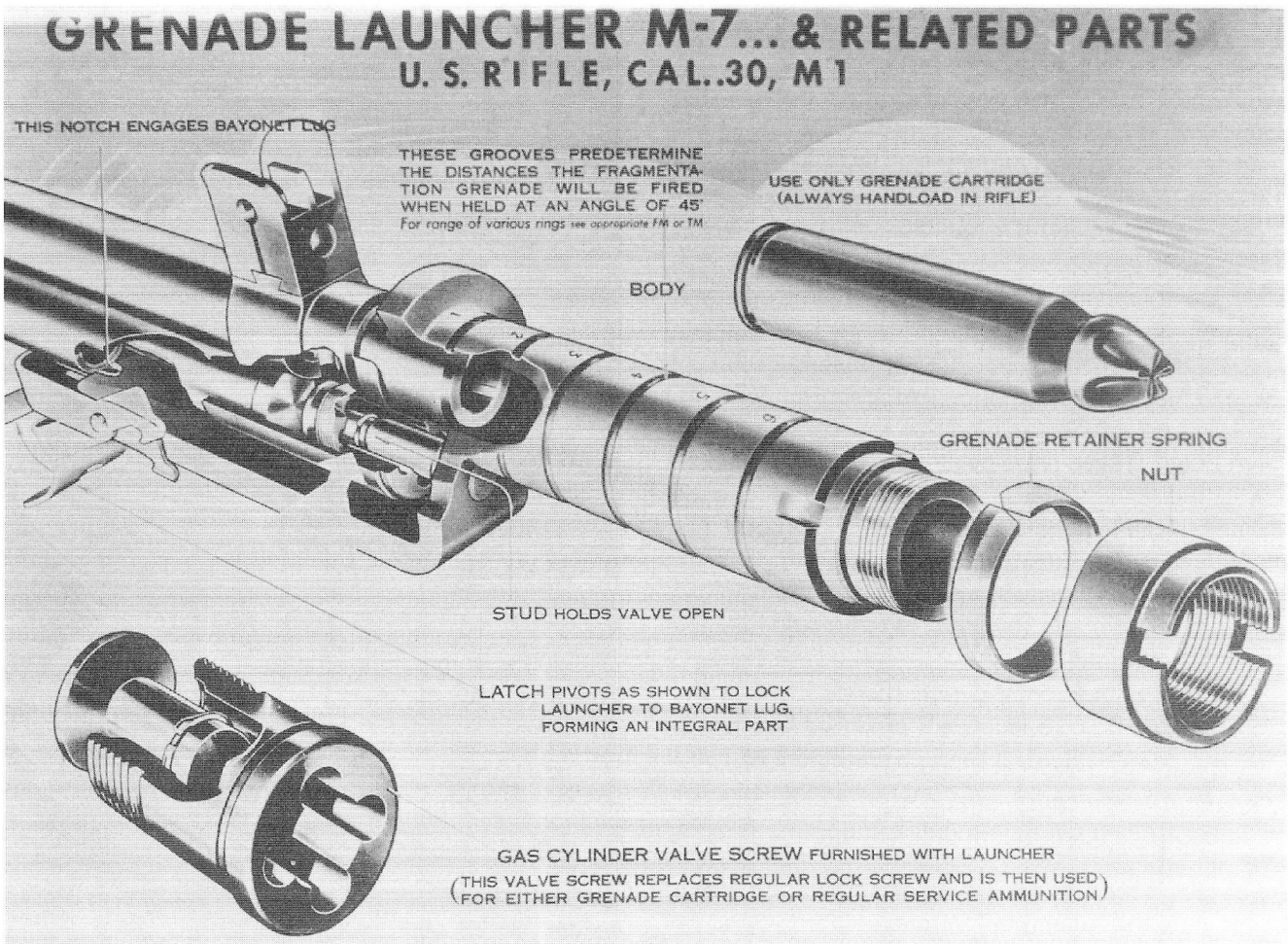
French soldier armed with a U.S. M1903 rifle and M1 launcher firing an M9A1 grenade. (U.S. Army)

M7 Grenade Launcher

While the M1 and M2 grenade launchers were in production, development of a satisfactory launcher for the semiautomatic M1 rifle continued. A number of T-models were tested and evaluated by the Ordnance Department. The T14 was eventually standardized on February 11, 1943, as the M7. The M7 attached to the M1 rifle's bayonet lug by a hinged clamp and had a stud that fitted into the rifle's gas cylinder valve screw to hold it open and vent excess gas. This prevented the M1 rifle from operating in the normal semiautomatic mode with the grenade launcher attached. A special type of valve screw was issued with each M7 launcher along with an instruction sheet. The original type of valve screw (B147851) remained open after the launcher was removed from the rifle and closed after a live round was fired. A later improved variant poppet valve screw (B7310079) adopted in January of 1944 closed immediately upon the launcher being removed from the rifle. The special type of valve screw was needed in order to "bleed off" the excess gas generated by the grenade launching cartridge that otherwise could have either blown up or otherwise seriously damaged the rifle.

The Knapp-Monarch Company received an order for 250,000 M7 launchers with production to begin in May of 1943. Production was to be at the rate of 50,000 per month by November of the same year. However, certain refinements were necessary in the M7 launcher before mass production could begin. Only 10 launchers were made in July of 1943, none in August and 1,500 in September. By December of 1943, it was apparent that Knapp-Monarch could not produce M7 launchers at the required rate. The contract amount was lowered to 180,000 with other cancellations to follow, although the firm continued in production through June of 1945. Part of Knapp-Monarch's problems with meeting its M7 production quotas was undoubtedly the fact that the firm was still involved in the closing stages of M1 launcher production. In order to take up the slack, the government decided that it would be a better course of action to spread a number of contracts around to several companies so that the failure of any one or two of them

Ordnance Department poster depicting the M7 launcher and related parts. (Small Arms of the World)



Two American soldiers with M1 Garand rifles and M7 grenade launchers with M9A1 rifle grenades. (U.S. Army)

would not totally disrupt delivery of the grenade launchers. A number of other firms were awarded M7 launcher production contracts including International Business Machine Corp. (IBM) (Poughkeepsie, New York), Fay and Scott (Dexter, Maine), Arrow-Hart & Hegman (Hartford, Connecticut), Hawley Smith Machine Company (Croton Falls, New York) and Mitchell & Smith (Detroit, Michigan). Ordnance Department records also indicate that the firm of Alfred Hoffman & Company was given an M7 contract, but no specimens made by this company have been noted. These firms began to deliver M7 launchers to the government in February of 1944, and by August of 1945, the sizeable total of 795,699 M7 grenade launchers had been made.

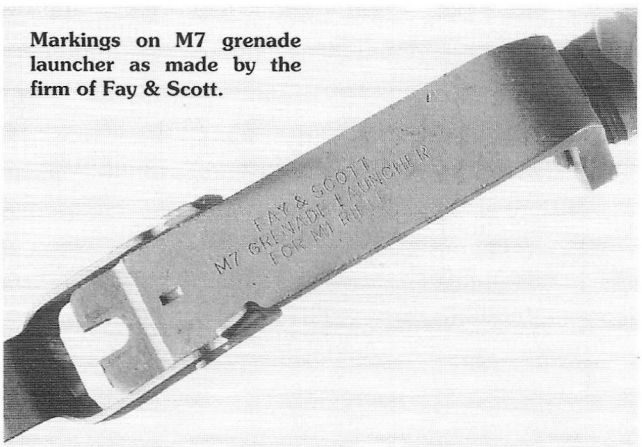
The M7 launchers were marked with the name of the manufacturer and stamped "M7 Grenade Launcher for M1 Rifle".

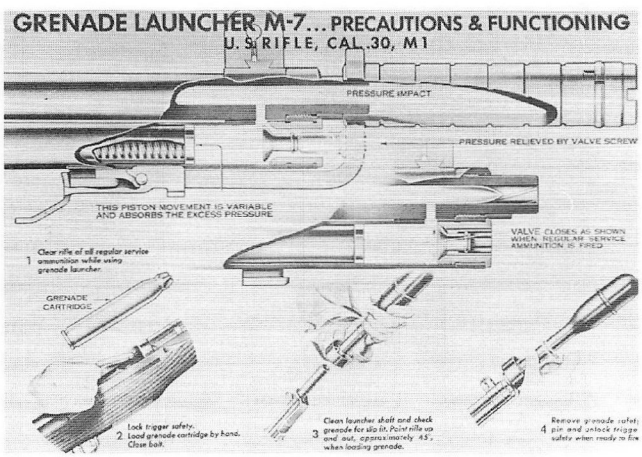
There was one major design change made in the M7. The first 35,678 launchers produced by Knapp-Monarch from September through December of 1943 had a removable nut on the front end of the launcher that held the flat retaining spring in place. All M7 launchers for the balance of production had a solid tube without the removeable nut and used a coil spring rather than the flat spring.

Very large numbers of M7 launchers were fielded during World War II. The M7 worked reasonably well but had the unpopular handicap of not allowing the M1 rifle to fire in the semiautomatic mode with the launcher attached. Obviously, a soldier would not ordinarily want to keep the launcher attached to his rifle any longer than necessary. The typical method of operation was to fire a grenade then quickly remove the launcher from the M1 so the rifle could be immediately fired. This led to the loss of a great many launchers because they would often be dropped in the heat of battle and not retrieved later. The high production numbers of the M7 were partly due to the high percentage of launchers lost in combat.

The Ordnance Department continued with plans to develop an improved launcher that could be used with the M1 rifle while enabling it to fire normally. A revised model was developed and designated as the T95. This version was further refined and eventually adopted as the M7A1 in July of 1945. The M7A1 was functionally similar to the M7 but had the very desirable feature of allowing the M1 rifle to fire normally with the launcher attached. The Hawley-Smith Company was

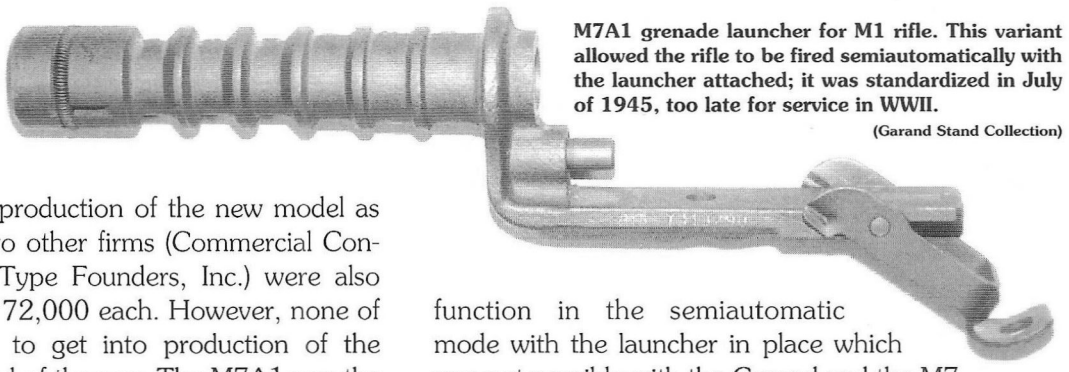
Markings on M7 grenade launcher as made by the firm of Fay & Scott.





Ordnance Department poster showing the operation of the M7 grenade launcher. (Small Arms of the World)

the only firm still in M7 production by the time the M7A1 was adopted and the company was ordered to change to the production of the new model as soon as possible. Two other firms (Commercial Controls and American Type Founders, Inc.) were also granted contracts for 72,000 each. However, none of the firms were able to get into production of the M7A1 prior to the end of the war. The M7A1 was the standard post-war launcher for the M1 rifle, and the Rock Island Arsenal was the major manufacturer of the launcher after the war. The M7 launcher was declared Limited Standard on June 14, 1945, just prior to the adoption of the M7A1. The M7 was the only type of grenade launcher used with the Garand rifle during World War II.



M7A1 grenade launcher for M1 rifle. This variant allowed the rifle to be fired semiautomatically with the launcher attached; it was standardized in July of 1945, too late for service in WWII.

(Garand Stand Collection)

While the M1 Garand rifle had gained a well deserved reputation as the premier battle rifle of World War II, its use as a grenade launching platform has often been overlooked. While the M7 launcher had the distinct disadvantage of limiting the rifle's semiautomatic firing capability, it was still a handy addition to the Garand when a GI needed to fire a rifle grenade.

M8 Grenade Launcher

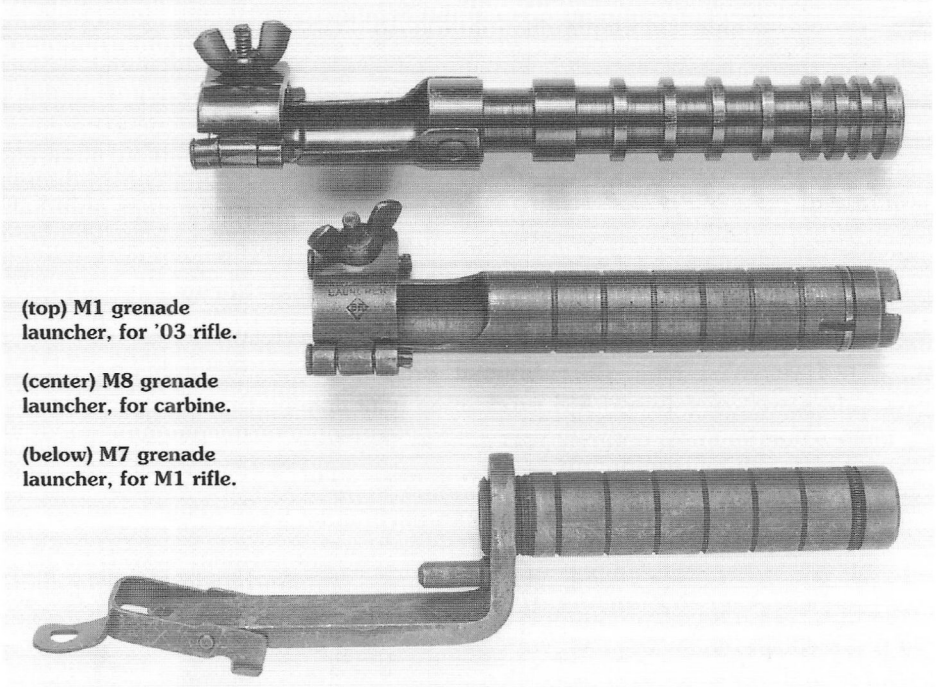
While work was underway on the M7 launcher for the M1 rifle, a launcher was also being developed for the M1 carbine. Although the original specifications for the carbine did not include a requirement for launching grenades, the large number of carbines being produced and issued made it apparent that a grenade launcher would be of value. The fact that problems were being encountered with the refinement of a launcher for the Garand also gave more urgency to the development of a grenade launcher for the carbine.

The carbine's gas system made the design of a suitable grenade launcher much easier than for the Garand. A launcher somewhat similar to the M1 and M2 launchers was designed that clamped on the end of the barrel and was held in place by a wing nut. Since venting of excess gas was not necessary, the carbine could function in the semiautomatic mode with the launcher in place which was not possible with the Garand and the M7 launcher.

The carbine grenade launcher was standardized as the M8 on February 11, 1943. Initial procurement of 100,000 units was authorized with half the number to be manufactured in the St. Louis Ordnance District and half in the New York Ordnance District. The St. Louis District awarded the contract for 50,000 M8 launchers to the Knapp-Monarch Company even though the firm was still involved in producing the M1 and M2 launchers and had just been awarded a contract to produce M7 launchers. The firms awarded the contract in the New York Ordnance District were the Sun Ray Photo Company and the Reliance Machine & Tool Company.

Reliance was the first company to get into M8 production and the firm delivered ten launchers to the Aberdeen Proving Ground for testing and evaluation in late July of 1943. The test results were satisfactory and the firm began mass production with 1,520 M8 launchers being produced in August.

Sun Ray delivered its first batch of 92 M8 launch-



(top) M1 grenade launcher, for '03 rifle.

(center) M8 grenade launcher, for carbine.

(below) M7 grenade launcher, for M1 rifle.

Marine "War Dog" handler, Cpl. Robert W. Lowe, on Okinawa. Note the M8 launcher fitted to his M1 carbine. (USMC)

ers in October. Knapp-Monarch also began production of the M8 launcher in the same month with an initial delivery of 100 units. There was some delay encountered with all of the firms getting into production due to on-going design refinements that resulted in changing production specifications and drawings. All three firms produced M8 launchers at maximum capacity until February of 1944, when the requirements were reduced. Reliance and Sun Ray's contracts were not renewed after their original orders, but Knapp-Monarch maintained M8 production until July of 1944 when its initial contract was fulfilled.

The demand for M8 launchers was greater than originally anticipated and production was ordered to be resumed in late 1944. Knapp-Monarch again started M8 production in January of 1945. For some unknown reasons, Sun Ray and Reliance Machine were not given additional contracts, but the firm of U.S. Cabinet Bed Company received a contract at this time for the manufacture of 55,000 M8 grenade launchers. This firm began delivery in March of 1945. By April, the renewed production began to satisfy the demand and Knapp-Monarch's contract was cancelled. The U.S. Cabinet Bed Company continued in production (although at a reduced rate) and delivered a total of 41,680 M8 launchers until Japan's surrender; their contract was cancelled soon after. The total production of M8 grenade launchers by all four manufacturers was 387,165. The M8 continued as standard issue after World War II.

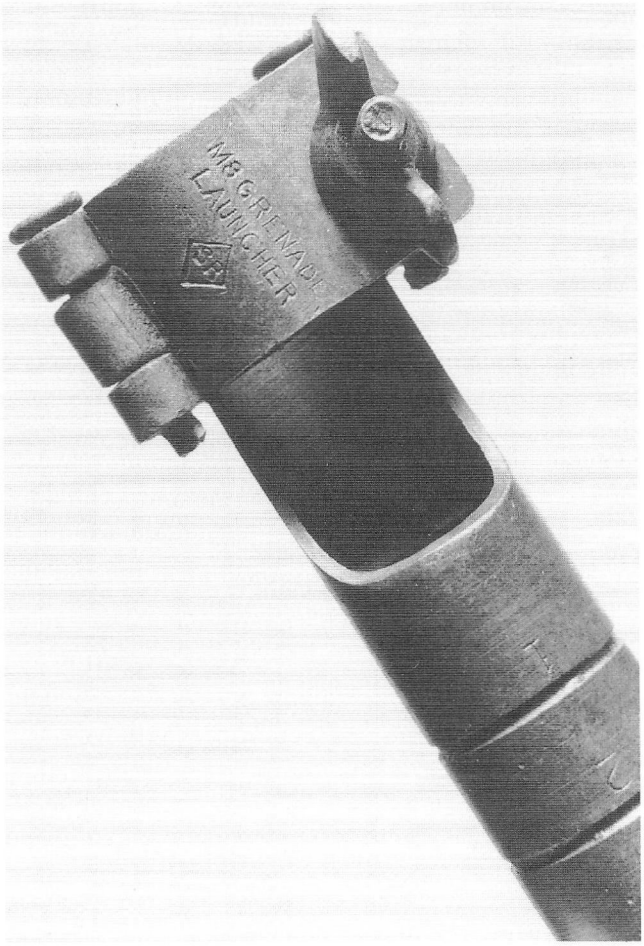
As was the case with the M7, there were two major variants of the M8 launcher. Early production M8 launchers had the same type of removeable front nut and flat retaining spring as did the early M7 launchers. There were 18,904 launchers of this type made by Knapp-Monarch, 25,000 by Sun Ray and 60,108 by Reliance, with a total production of 104,012. All subsequent M8 launchers were manufactured with a solid

M1 Garand rifle with M7 grenade launcher. The M7 launcher was made in very large numbers but had the handicap of not allowing the rifle to be fired semiautomatically with the launcher attached.

M1 carbine with M8 grenade launcher. The carbine could be fired with the M8 launcher attached, which made it a more popular grenade launching platform with many soldiers during WWII than the Garand. This carbine is fitted with a canvas pouch on the stock that holds two 15-round magazines.

tube body and a coil spring like the late production M7 launchers. The M8 launchers were marked "M8 Grenade Launcher" and stamped with the logo of the manufacturer. The M8 was the only one of the World War II rifle grenade launchers to remain classified as standard issue after the end of the war and carried in the post war reserve. The other rifle grenade launchers had been declared either obsolete (M2) or Limited Standard (M1 and M7).

While the designers of the carbine never envisioned its use in launching rifle grenades, large numbers were so employed. The fact that a weapon weighing just over five pounds could stop a tank was amazing. However, there were some drawbacks when using a carbine to launch rifle grenades. Almost all types of rifle grenades generated a great deal of recoil when fired, and the carbine's stock was often split or cracked. The firing of a rifle grenade was even tougher on the folding stock M1A1 carbine and regulations called for this weapon to be used for launching grenades only in an emergency. The stock was to be folded and the pistol grip pointed upward, with the rear of the stock firmly held on the ground. Firing a rifle grenade with the M1A1's stock extended would usually bend or crack the metal. Despite these problems, the use of the carbine as a grenade launcher was common during World War II. The carbine was more popular than the Garand as a grenade launching weapon because its operation was not affected with the launcher in place.



Markings on M8 launcher made by the Sun Ray Photo Co.

Grenade Launching Ammunition

In order to launch grenades from the various models of launchers, special ammunition was necessary. Obviously, the standard ball or armor piercing cartridges could not be used. A special cartridge was developed that produced sufficient gasses to propel the rifle grenades. The grenade launching ammunition looked somewhat like blank cartridges but can be identified by their crimped necks.

Cartridge, Rifle Grenade, Cal. 30, M3

The M1 launcher (M1903 rifle), M2 launcher (M1917 rifle) and the M7 launcher (M1 rifle) utilized the M3 grenade cartridge to launch rifle grenades. The M3 was loaded with approximately five grains of very fine black powder and 40 grains of smokeless powder. This load was designed to propel the standard M9A1 antitank grenade with a velocity of approximately 180 feet per second. The M3 cartridges were generally issued in ten round cartons.

Cartridge, Grenade, Carbine, Cal. 30, M6

The carbine's M8 grenade launcher was used with the M6 grenade launching cartridge. This round was loaded with approximately one grain of 60mm mortar ignition powder and about 20 grains of smokeless powder. The formulation was designed to propel the M11A2 practice grenade at a velocity of approximately 145 feet per second. The M6 cartridges were usually packed in cartons holding six rounds.

Cartridge, Grenade, Auxiliary, M7

In order to increase the range of a rifle grenade, an auxiliary cartridge was developed. This small cartridge was inserted into the grenade launcher tube prior to placing a grenade on it and was ignited by either the M3 or M6 cartridge. The use of the M7 auxiliary cartridge increased the velocity of the grenade by 40 to 90 feet per second and the range by 60 to 100 yards. The use of the auxiliary cartridge markedly increased the recoil of the rifle and its utilization in the carbine was restricted to emergency use. The M7 cartridge was quickly dubbed the "vitamin pill." It often proved quite useful in increasing the rifle grenade's range beyond that allowed by the standard grenade cartridge alone.

A selection of World War II grenade launching ammunition.

World War II rifle grenades (left to right): M11 practice grenade; M11A1 practice grenade; rifle grenade carrying bag; Mk II fragmentation hand grenade on M1 adapter; ground signal parachute flare.

Rifle Grenades

There were two basic categories of rifle grenades. The first type consisted of hand grenades, which were projected from the rifle grenade launcher by means of an adapter. The second category consisted of grenades designed specifically as rifle grenades.

Grenade Projection Adapters

M1 and M1A1 Adapters

A device to allow the standard Mark II fragmentation hand grenade to be fired from a rifle grenade launcher was adopted early in World War II as the "Grenade Projection Adapter, M1." The M1 adapter held the hand grenade securely by means of four retaining claws that firmly grasped the grenade's serrations. One of the claws had a metal arming clip into which the grenade's safety lever was fitted and held in place. Early production M1 adapters had a solid fin assembly, but later versions utilized a slotted fin assembly. A revised adapter was adopted as the M1A1 and was similar to the M1 except it had only three claws, a solid fin assembly and a cup into which the grenade rested. Both launchers were about seven inches long and painted olive green.

The M1 and M1A1 adapters were simple yet effective devices. The Mark II fragmentation grenade was inserted into the adapter and the safety lever was inserted into the arming clip. The grenade's safety pin was pulled, but the arming clip held the safety lever securely in place. When the grenade was fired from the launcher, the arming clip was sheared away; this released the safety lever. The timing fuze then caused the grenade to explode after the allotted elapsed time. By using the Mark II grenade in such a manner, it was possible to inflict enemy casualties by effective air bursts and to otherwise launch a fragmentation grenade much farther than could be done by hand throwing.

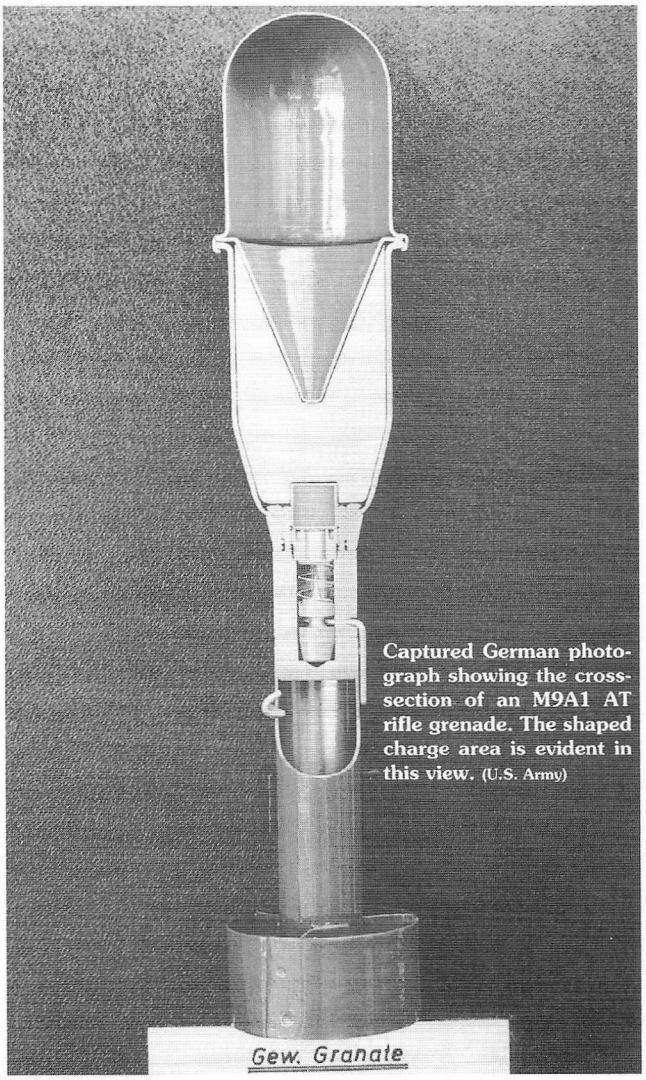
Due to the heavy recoil generated by the rifle grenade and the fact that a curved trajectory was usually the most effective, the butt of the rifle (or carbine) was placed on the ground for firing. Regulations called for the rifle grenade to be launched with "...the butt turned sideways to avoid stock breakage."

The M1 and M1A1 adapters saw much use during the war and bridged the gap between hand-thrown grenades and mortars. With practice, a soldier could fire fragmentation grenades with surprising accuracy for a distance of almost 200 yards.

The book *Weapons of World War II* relates the

Marines helping a wounded comrade. Note the MkII fragmentation grenade and adapter on the M7 launcher in the foreground. (USMC)

Soldier preparing to fire an M9A1 AT rifle grenade from his M1903 Springfield. (U.S. Army)



Captured German photograph showing the cross-section of an M9A1 AT rifle grenade. The shaped charge area is evident in this view. (U.S. Army)

following comment of a private in the 28th Infantry Division who fought in the battle for France.

The Mark II fragmentation grenade was fired from the rifle, using a grenade projector adapter M1 and is very effective in firing into pillbox doors.

The M1 and M1A1 adapters were used to launch fragmentation hand grenades from all four types of rifle grenade launchers during World War II.

Chemical Grenade Adapters

A device somewhat similar to the M1/M1A1 adapter was developed for use in launching the various types of chemical grenades from the M1, M2, M7 and M8 grenade launchers. This adapter was standardized as the "Chemical Grenade Adapter, M2." It had a solid fin assembly and held the chemical grenade in place by three clips and a set-back band. A slightly improved version was adopted as the M2A1, which differed primarily in having a slotted fin assembly. The M2 and M2A1 adapters were used in launching the different types of chemical grenades, including the colored smoke grenade and the white phosphorous grenade. These adapters could be used to launch the offensive hand grenade as well.

The M2/M2A1 adapter was functionally identical to the M1/M1A1 types, with the chemical grenade held in place by the retaining clips and the safety lever secured by the set-back band. Upon firing, the set-back band was sheared off, the safety lever released and the grenade ignited after the prescribed time.

M17 Impact Fragmentation Rifle Grenade

The only other type of fragmentation grenade launched from rifles during World War II was the "M17 Impact Fragmentation Grenade." This grenade was tested as the T2 and eventually standardized as the M17. It consisted of a fragmentation grenade roughly similar to the Mark II hand grenade but with an impact rather than a time fuze. The M17 was designed strictly as a rifle grenade and was not adapt-

ed from a hand grenade. Due to the inherent danger of an impact fuze, few M17s were made and issued.

Antitank Rifle Grenade

One of the most important types of rifle grenades used in World War II was the antitank grenade. The first type was the M9, which saw use early in the war but was soon superseded by the much improved M9A1. The M9A1 was the standard American antitank rifle grenade for most of the war and saw a great deal of use.

The M9A1 had a sheet metal body and ogive (nose) that contained a shaped charge similar to that used in the bazooka AT rocket. The grenade utilized an impact fuze and had a safety pin that had to be removed before firing. The M9A1 grenade could penetrate three to four inches of armor. It weighed about 1.31 pounds and had a maximum effective range of 250 yards although it was seldom used at such distances.

The M9/M9A1 was developed as a replacement for the unsuitable M10 grenade. As discussed, the heavy weight (over three pounds) of the M10 made it virtually impossible to fire from a rifle; this led to the development of the bazooka. While the M9A1 produced heavy recoil when fired from a rifle grenade launcher, it was within manageable levels compared to the unusable M10.

The following passage regarding the M9A1 grenade is contained in the Office of the Chief of Military History book, *The Ordnance Department: Planning Munitions for War.*

The antitank rifle grenade, containing only four ounces of pentolite, would penetrate up to four inches of homogeneous armor plate at a normal angle of impact. If not so powerful as the antitank rocket, which had equal penetration at angles of impact as great as 50 degrees, the M9A1 rifle grenade still did excellent, albeit less publicized, work not only against tanks but bunkers and pillboxes, where its good fragmentation characteristics were especially valuable. There were times when the infantryman preferred it to the bazooka because the grenade launcher could be fitted on the rifle he already had and did not involve carrying an extra weapon.

The value of the M9A1 for uses other than as an antitank weapon is echoed in the book *Weapons of World War II,* which states

It (the M9A1) was also a very effective weapon against bunkers and pillboxes, in that it could be projected into embrasures where its excellent fragmentation characteristics were particularly valuable against personnel.

The preference of some infantrymen for the antitank rifle grenade over the bazooka is confirmed in another Army Ordnance report which stated that "....many officers preferred the rifle grenade to the bazooka as a close-range antitank weapon."

The M9A1 proved its effectiveness in many instances during the war. As an example, a first lieutenant in the 45th Division reported the following experience with the M9A1 rifle grenade.

In March, during street fighting in a German village, I saw a replacement knock out a Mark VI (Tiger) tank with a rifle grenade fired from an M1. The G.I. was partially concealed in a house about 15 feet from the tank as it came down the narrow street. He fired one round which hit the turret, blowing up the ammunition in the tank and killing the entire crew. Our battalion has knocked out about 10 German tanks with rifle grenades over a period of 18 months.

The M9A1 was a simple and easy to use weapon. The grenade was fitted onto the launcher at the desired range increment. A safety pin was fitted through the stabilizer tube and was removed prior to firing the grenade. Unlike the fragmentation and chemical rifle grenades, it was usually necessary to fire the antitank rifle grenade using a flat trajectory. This necessitated firing it from the shoulder rather than having the butt of the rifle on the ground to absorb the recoil.

There were very few reports of M9A1 grenades causing accidents due to design or manufacturing malfunctions. General G.M. Barnes writes in his book *Weapons of World War II:*

The incidence of fatal malfunctions caused by poor quality was remarkably low considering the magnitude of the output. The frequency of accidents due to mishandling was no less remarkable, considering the constant need that the soldier had for grenades. To cite one frequently used type, the antitank rifle grenade, malfunctions from all causes were only one per million. This record is a distinct tribute to the engineering skill in design, production and inspection applied to this important item.

Despite its excellent reputation and General Barnes' comments, there were some problems encountered with the M9A1 grenade, particularly in the Pacific. However, these were generally attributable to the inclement weather conditions rather than any design or production flaws. As an example, a 1943 Marine Corps evaluation of infantry weapons used by the Raiders on New Georgia Island reported,

Anti-Tank Grenade, Mark 9 A1 (sic). Three-fourths of these grenades failed to function, probably caused by both being wet and striking soft ground, but if a more sensitive nose could be used, so as to ignite upon impact with mud or brush, it would be a valuable and effective weapon.

This problem is echoed in *The History of U.S. Marine Corps Operations in World War II.*

...antitank rifle grenades..in poor condition from exposure to the frequent rains, proved ineffective against the Japanese armor.

The recorded failures due to prolonged exposure to dampness were not confined to rifle grenades, as the same problems were reported with bazooka rockets and mortar shells. Overall, the M9A1 antitank rifle grenade was an important infantry weapon of World War II but is generally unheralded today.

Smoke Rifle Grenades

The various types of smoke rifle grenades essentially paralleled the same category of hand grenades and generally had the same basic usage. These devices had the stabilizer tube and fin assembly as integral parts of the grenade and did not require a separate adapter for launching as did the smoke hand grenades.

White Phosphorus

Chemical Warfare Service documents reflect that over two million white phosphorus (WP) rifle grenades were manufactured during World War II and supplied to both Army and Marine Corps infantry units. As with the WP hand grenade, the white phosphorus rifle grenade was used for both smoke concealment purposes and as an effective (and feared) anti-personnel weapon in its own right. As stated by General G.M. Barnes,

The white phosphorus rifle grenade and rifle smoke grenade were devised for smoke-screen work, but the former provided good antipersonnel effect as well, by dispersal of burning phosphorus.

This is confirmed in an Ordnance Department Technical Services report, which stated,

A favorite with the infantryman was the WP rifle grenade, which was extremely useful in cleaning the enemy out of open trenches or smoking him out of bunkers and foxholes.

The standard World War II white phosphorus rifle grenade was the M19. The M19's stabilizer and fin assembly were very similar to that of the M9A1 antitank grenade. As stated in Army training manuals, "Smoke rifle grenade (WP) M19 burst upon impact with the ground scattering white phosphorus over a radius of 10 yards, which ignites spontaneously and burns giving off a dense white smoke. The burning particles of WP will create casualties as well as set fire to inflammable targets."

Colored Smoke Rifle Grenades

M22

The standard colored smoke rifle grenade of World War II was the M22. This grenade was produced in four colors; red, green, violet and yellow. The M22 was fitted with a fuze that detonated upon impact with the ground. The smoke rifle grenade was used for signaling and marking targets.

M23

The M23 was similar to the M22 but was classified as a smoke streamer grenade. The M23 was not fitted with either a safety pin device or an impact fuze. The colored smoke filler was ignited by the burning gases from the grenade launching cartridge. The M23 burned for a minimum of 12 seconds and gave off a continuous stream of colored smoke throughout its range of about 250 yards. The M23 was produced in the same four colors as the M22.

HC Rifle Smoke Grenade

The M20 rifle smoke grenade was essentially identical to the M22 colored smoke grenade in design, construction and utilization. The chief difference was that the M20 contained a filler that burned for about 30 seconds upon impact with the ground and produced a dense white smoke. As was the case with the AN-M8 HC smoke hand grenade, the purpose of the M20 was to conceal troop movements and provide smoke cover for the infantry.

Ground Signal Rifle Grenades

In addition to the various types of rifle grenades, two variations of flares were widely used during World War II with the grenade launchers for signaling purposes. While not classified as weapons, these devices illustrate the versatility and usefulness of the rifle grenade launchers.

M17A1 Ground Signal, White Star, Parachute

The M17A1 contained a parachute flare that separated from the case at about 400 feet in the air. The flare burned for approximately 30 seconds and could be used for brief illumination purposes and signaling. Other than the white star, this device was also produced in three colors: green (M19A1), amber (M21A1) and red (M51A1).

M18A1 Ground Signal, White Star, Cluster

This flare was used in the same manner as the parachute flares but contained five pyrotechnic stars that were ejected from the case at approximately 400 feet and burned for about five seconds. This flare was produced in three other colors: green (M20A1), amber (M22A1) and red (M52A1).

Practice Rifle Grenades

As with the hand grenade, training green recruits with live rifle grenades could be quite hazardous. Several types of inert practice rifle grenades, having only minor differences, were produced and issued.

M11 practice grenade, dated 7-42. (Garand Stand Collection)

M11

The M11 was the first variant of the practice rifle grenade adopted. It was of the same size and approximate weight as the M9 antitank grenade. This grenade was made of black painted cast iron and was about 9.25" in length. Due to the brief tenure of the M9 AT rifle grenade, relatively few M11 practice grenades were produced.

M11A1

With the standardization of the M9A1 antitank grenade, a practice grenade simulating this weapon was introduced as the M11A1. The M11A1 was of the same configuration, size and weight as the M9A1 AT rifle grenade. The M11A1 had a solid metal body and stabilizer tube, but the fin assembly could be replaced if damaged.

M11A2

Due to the propensity of practice rifle grenades becoming damaged, an improved version of the M11A1 was adopted as the M11A2. It was designed so that all four of the main components (body, stabilizer tube, nose and fin assembly) could be replaced if damaged. The M11A2 was made in large numbers during World War II and into the early 1950s. All versions of the World War II practice rifle grenades were painted black with either white or yellow lettering. Two very minor later variants of this grenade (the M11A3 and M11A4) were made after World War II.

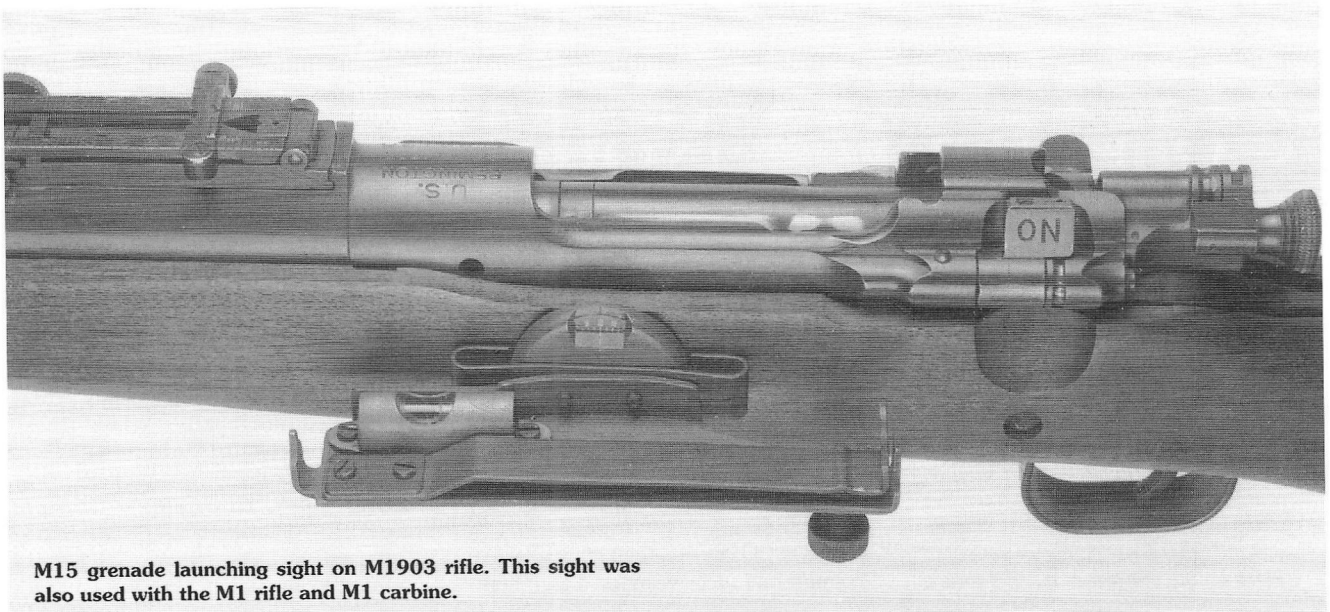
Grenade Launching Sights

Sight, Rifle, Grenade Launcher, M1

In order to improve the accuracy of rifle grenades, several types of auxiliary sights were used. The first type developed for use with the M1903 and M1917 rifles was standardized as the M1. This rather crude sight was constructed of two stamped sheet metal front and rear sights that were aligned to achieve the required angle of elevation. The two sight components were fastened to the rifle by springs and attached together by a wire spacer. The M1 rifle grenade sight saw very limited use early in the war and proved to be unsatisfactory. It was soon dropped from use pending the development of a better sight.

Sight, Rifle Grenade, M15

Several types of rifle grenade sights were tested with varying degrees of success. The best design proved to be the T59E3, which featured a sighting bar with a leveling bubble and a front post bar and rear peep sight. The T59E3 could be used with the M1903



M15 grenade launching sight on M1903 rifle. This sight was also used with the M1 rifle and M1 carbine.

and M1 rifles and the M1 carbine. A mounting plate was installed on the weapon's stock by two screws. The sight assembly attached to the mounting plate and could be elevated or depressed from zero to 60 degrees. Some 20,000 T59E3 sights were manufactured in February of 1944, and the sight was standardized in March of 1944 as the M15.

The M15 could be used to launch both antitank rifle grenades using the peep sight and fragmentation or smoke grenades with the bubble level. Very large numbers were made and saw issue late in the war.

Recoil Boot

Another interesting accessory issued with many rifle grenade launchers was a black rubber recoil boot. This boot slipped onto the butt of the rifle and contained a thick rubber pad. The face of the pad was embossed with "US", an Ordnance flaming bomb and the drawing number ("B200968"). The boot was most often used with the M1903 rifle and could be used with the M1917 and the M1 rifles, but it would not fit the carbine. The boot was designed to help cushion the heavy recoil of the rifle grenade when fired from the shoulder. It also lessened the possibility of stock breakage when the butt of the rifle was on the ground. The recoil boot was apparently not used in extremely large numbers during the war.

Rubber recoil boot issued with the M1 and M2 grenade launchers.

Collector Notes

Very few live grenades are in the hands of collectors today for obvious reasons. Such weapons are classified as Destructive Devices and subject to registration and regulation, including the payment of a $200 transfer tax. Very few live grenades have been registered in the past, and any such grenades found today cannot be legally owned or transferred unless previously registered. Of course, one would not normally wish to have live grenades in his gun room or den. On the other hand, there are some deactivated grenades on the collectors market today, in addition to very large numbers of inert training and practice grenades. These do not require any sort of Federal registration and are certainly more sensible and practical than the possession of live grenades.

The most common type of inert hand grenades are the Mark II and Mark IIA1 practice grenades with the small black powder charge removed and a dummy fuze attached. These appear virtually identical to the Mark II fragmentation grenades and are excellent representative examples of such weapons. Large numbers of the Mark IA1 cast iron training grenade are also around but are less popular since they are not as realistic in appearance as the practice grenades. Both types can generally be found at reasonable prices today.

Most of the various colored smoke grenades can still be found from time to time and do not require Federal registration. Since these are usually unaltered, they must be treated with some care because they could be accidently set off if handled improperly. While smoke grenades, except for the WP and irritant gas variety, probably wouldn't cause any serious injury, an accidental discharge could cause all sorts of problems ranging from minor inconvenience to interior damage to a building. Live WP grenades

and incendiary hand grenades should be treated with the same care as the fragmentation grenades and the possession of such items is not a good idea.

As with hand grenades, very few live rifle grenades are around in collector's hands today. The M11A1 series of practice rifle grenades are commonly found at generally attractive prices. These are very similar in appearance to the M9A1 AT rifle grenade and are impressive when mounted on a grenade launcher. Some individuals enjoy launching these dummy grenades from rifles and carbines.

The various colored smoke and ground signal grenades are still around in fair numbers and the same caveat mentioned above applies to them. These are sometimes fired from launchers, but the fact that most of them are nearly 50 years old makes their use problematical at best. All applicable state and local laws regarding grenade launchers should be known before possessing or using such items.

M1 Launcher

M1 rifle grenade launchers are very popular items with '03 collectors today. These have always been fairly tough to locate and are growing harder to find and more expensive every year. These are easy to recognize as they are marked "U.S. Rifle .30 M1903A1" and have the Knapp-Monarch logo, a lightning bolt going through the letters "KM". An original M1 launcher is a very desirable item today. Fakes have not yet been reported, but it is probably only a matter of time until they start to appear on the market.

M2 Launcher

As stated, the M2 launcher is virtually identical to the M1 except for the markings "U.S. Rifle .30 M1917". Like the M1, all M2 launchers were made by Knapp-Monarch and stamped with the firm's logo. The M2 launchers converted into M1 appear to be more common today than unaltered M2 launchers. These can be identified as the "17" was overstamped "03" and the launcher was refinished in black tinted parkerizing rather than the original bluing. An altered M2 would probably have about the same value as an original M1, although many collectors would likely prefer the latter.

M8 Launcher

As with the M1 and M2 launchers, original World War II production M8 grenade launchers can be tough to find today and usually fetch a handsome price. Unlike the M1 and M2 launchers however, there are large numbers of fake M8 launchers on the market (euphemistically referred to as reproductions). Many of these are very well made and may appear to be legitimate items to the untrained eye. The bogus M8 launchers are generally of the late pattern (without the removeable front end) and have authentic looking "M8" markings. The easiest way to ascertain the desirable original WWII M8 launcher is to observe the manufacturer's logo markings. All the genuine M8 launchers were made only by Knapp-Monarch, Reliance Machine, U.S. Cabinet Bed and Sun Ray Photo. Any others are reproductions.

M7 Launcher

By far, the most common and inexpensive type of World War II rifle grenade launcher today is the M7. Large numbers were made and a great many have survived to the present day. There are many interesting marking variants, including launchers made by one firm and supplied to another. These have the original markings lined out and new markings added. Some interesting M7 collections have been assembled and this is a fertile field for a collector on a modest budget looking for an interesting topic.

Due to the large number of inexpensive M7 launchers around, fakes are not a problem. The M7A1, which was adopted very late in World War II, was not manufactured during the war. This launcher and the later M7A2 are relatively uncommon, but the last production version, the M7A3, is quite common. Only the M7 launcher would be proper for a World War II collection.

Unusual rifle grenade adapted from a 60mm mortar shell. (U.S. Army)

Accessories

Sights

The M1 grenade launching sight is a very rare item and seldom seen on the market. Relatively few were made and almost none of them survived the war. An example would be a very interesting and desirable addition to a collection. The M1 sight would only be properly found on a M1903 rifle (or possibly a M1917) used early in World War II for grenade launching.

The M15 sight, on the other hand, is still very commonly seen today at quite reasonable prices. Most will be found still in their green canvas belt pouches complete with mounting bracket and instruction sheet. M15 sights would be properly found on M1903s, M1s and carbines used late in World War II for grenade launching duty. The M1917 was phased out of service by the time of the M15's adoption, so it is unlikely any were ever used on this rifle. Several different manufacturers of the M15 will be noted.

Recoil Boot

The black rubber grenade launching recoil boot can still be found today but is becoming a bit harder to locate. Some people have incorrectly stated that such items were for use on military shotguns. The boot would be proper for the M1903 and probably the M1917 rifle as well. Its use on the M1 was not as common, but it did see some service with the Garand also.

A World War II rifle or carbine with an attached grenade launcher and a dummy rifle grenade is a very impressive and interesting item in a collection or display. Likewise, a mannequin festooned with inert fragmentation grenades adds a touch of realism.

Hand grenades, rifle grenades and grenade launchers are seldom explored topics and little has been written about them. This is actually a bit mystifying because these weapons were widely used in World War II and are very interesting items. Undoubtedly, the fact that live grenades are not collectible items is the major reason. However, the fact remains that grenades of both types were valuable infantry weapons during the war. They should not be forgotten when examining the weapons of World War II.

World War II mortar crew sighting an M1 81mm mortar with the M4 sight. While not as portable as the smaller 60mm mortar, the 81mm packed a larger punch and filled the void between the smaller weapons and artillery. Note the M1917 .45 cal. revolver worn by the crewman on the left. (U.S. Army)

Mortars

A very important weapon to the infantryman of World War II was the mortar. Mortars filled the large void between grenades and artillery. Mortars provided artillery-like fire support when artillery was either not available or couldn't be moved forward fast enough to support rapidly moving troop advances. General G.M. Barnes remarked, "Comparing weight of material to ammunition delivered at the target, they (mortars) are the most efficient of weapons."

Actually, the use of mortars in warfare has its roots in antiquity. These early mortar-type weapons were generally large and cumbersome siege mortars. Mortars of this type were widely used during the American Civil War but were eventually supplanted by more efficient large artillery pieces.

The mortars used in the Second World War were improved models of the trench mortars that saw wide use during World War I. Due to the trench warfare of World War I, the need soon arose for a weapon that had relatively short range (as compared to artillery) and a high angle of trajectory in order to inflict casualties in enemy trenches. All of the belligerent nations fielded trench mortars, and one of the most successful versions was the British Stokes mortar, invented by Sir Frederick Wilfrid Scott Stokes.

The Stokes mortar shared traits common with most other trench mortars of the period. The weapon consisted of a smooth bore tube with a fixed firing pin on the bottom of the tube. The tube fitted into a metal plate that rested on the ground and absorbed the recoil force. The front end of the tube was supported by a bipod that was adjustable for elevation. The Stokes mortar was not fitted with a mechanical or optical sight but was lined up on target by sighting along a white line drawn the length of the tube.

The mortar weighed 110 pounds and could be broken down into three components for carrying: the tube (43 pounds), the bipod (37 pounds) and the base plate (30 pounds).

The Stokes mortar fired a shell (or bomb), which consisted of a simple metal cylinder containing an explosive charge of two pounds of TNT. The entire shell weighed about 12 pounds. The Stokes mortar shell fired by means of a shotgun-like cartridge that was inserted into the base of the shell and exploded upon impact with the fixed firing pin in the base of the tube. The range was determined by placing a certain number of small rings (made from silk bags) of explosive propellent (ballistite) around the cartridge container. The greater the number of ballistite rings attached to the base of the shell, the farther the range. Stokes patented his mortar in the United States on May 23, 1916, and the ammunition in June of 1918.

Upon General Pershing's recommendations, the United States Army adopted the three-inch Stokes mortar just a few months after our entry into the war. Over 1,300 were acquired by the U.S. Army during World War I. After the war, an evaluation of the Stokes mortar pointed out two serious deficiencies: lack of range and inaccuracy. Both of these problems were due, at least partially, to the firing of a projectile without stabilizing fins from a smooth bore mortar. This usually led to tumbling in flight, which obviously reduced both distance and accuracy. The lack of an effective sight also had a negative bearing on the accuracy potential of the Stokes mortar.

After World War I, Edgar William Brandt of Paris, France, committed his firm to the development of an improved Stokes mortar. Brandt recognized that the basic Stokes mortar was a sound design and concentrated primarily on improving the unsatisfactory ammunition. Brandt developed a mortar projectile that had a streamlined shape and stabilizing fins and proved to be very accurate at ranges from 200 yards to 3350 yards. In place of the silk ballistite rings of propellent used on the Stokes shell, Brandt substituted

81mm mortar and accessories. (from top, left to right) M1 81mm tube, M49 (TNT) round, practice round, M4 mount in folded position, T&E mechanism, M14 leather carrying case for M4 sight, baseplate (note the 3 position for the tube's ball-type base), box of M3 ignition cartridges and two loose rounds, M4 sight and two World War II 81mm mortar manuals. (Robert G. Segel Collection)

celluoid packets, or strips, which clipped to the shell's fins. As with the earlier ammunition, the range was determined by the number of propellent strips attached.

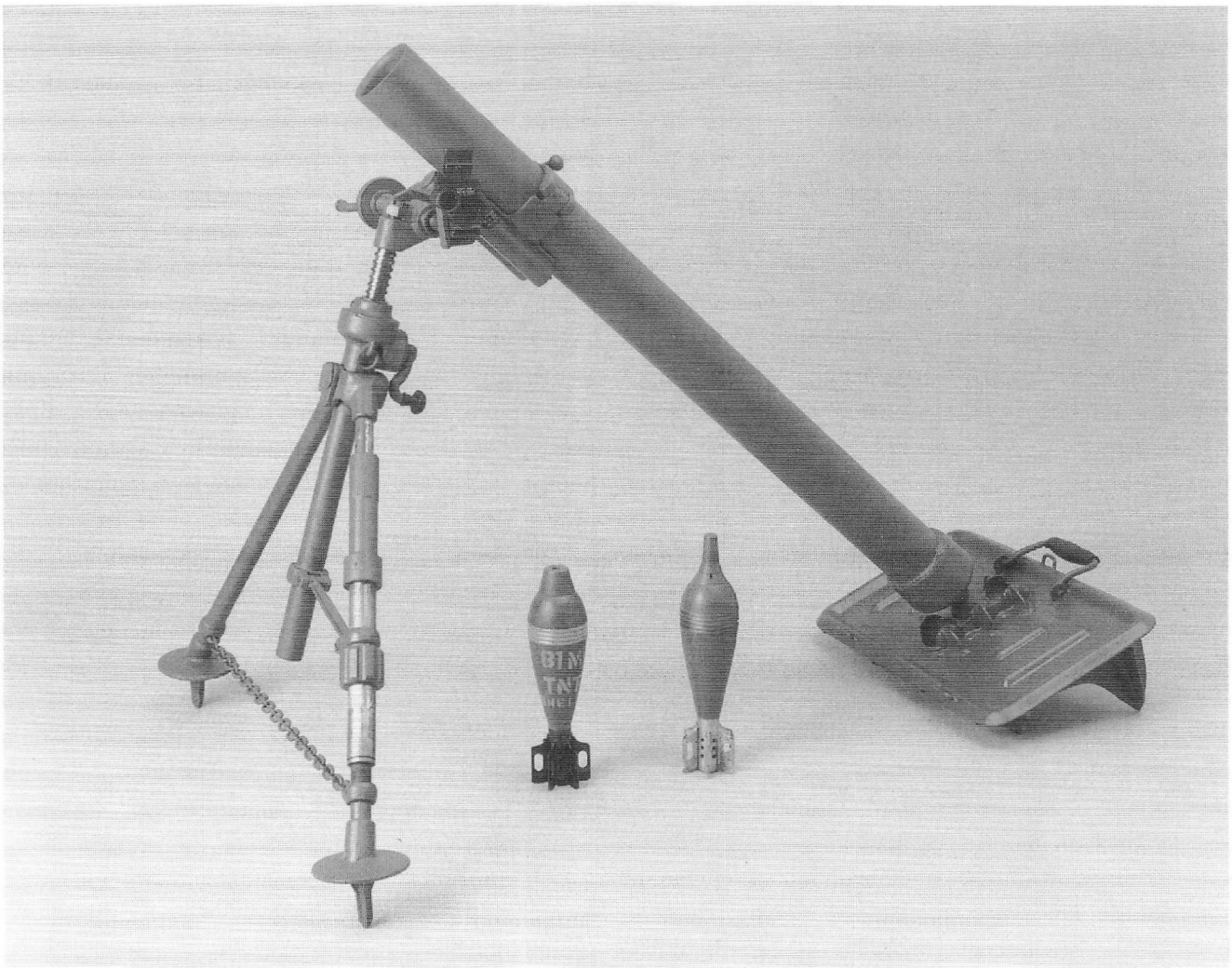
In 1927, the 81mm "Stokes-Brandt Mortar, Model 1927" was introduced. The basic mortar was very similar to the original World War I Stokes trench mortar but was provided with a collimator-type sight and a spring buffer to reduce the stress of firing on the bipod and sight. Brandt continued refinement of his 81mm mortar and in 1931 the U.S. Army purchased four mortars of his latest design for testing. These were designated as the "81mm Stokes-Brandt Mortar, T4." The T4 mortar differed from the Model 1927 design by having a slightly improved bipod, sight and base plate.

While the Army was testing the new T4 mortar, the WWI-vintage Stokes mortars remained the U.S. Army's standard mortar. The weapon was redesignated as the "Mortar, Trench, 3", Mark I and Mark IA2," and some even saw service during World War II.

81mm M1 Mortar

In the late 1930s, the United States government purchased the manufacturing rights from the Brandt Company and the T4 mortar was standardized as the "81mm Mortar, M1 with Mount M1." The M1 mortar, complete with M1 mount, weighed 136 pounds. As with the earlier Stokes mortar, the 81mm mortar could be broken down into its three basic components for transport. These consisted of the tube (44.5 pounds), the mount (46.5 pounds) and the base plate (45 pounds). As can be seen, the weight of the three component units was very similar and the burden of carrying the M1 mortar could be equally divided.

The M1 81mm mortar was very similar to the older



81mm M1 mortar manufactured in 1943 with M4 mount, M4 sight and baseplate. An inert practice round and M49 (TNT) round are in the foreground. The 81mm mortar saw widespread use in World War II and provided valuable fire support to the infantry.
(Robert G. Segel Collection)

three-inch Stokes but had the following differences.

(1) The barrel (tube) was of heavier construction to withstand the higher pressures generated by the more modern ammunition. The M1 mortar barrel was machined to finer tolerances than was the Stokes mortar.

(2) A cross-leveling mechanism was attached to the left leg of the bipod.

(3) The clamp that attached the bipod to the barrel was easily adjusted to four different positions.

(4) The improved base plate consisted of a pressed steel body and welded braces, flanges and two carrying handle plates. A socket was welded onto the base plate which had three seats for the spherical end of the mortar tube's base cap.

(5) The M1 mortar was equipped with a greatly improved sighting apparatus, which included a collimator, elevating and, later, deflection mechanisms and longitudinal and cross levels. The sight mechanism mounted with a dovetailed base into a slot on the mortar yoke. The M1 was capable of much greater accuracy than was possible with the old Stokes mortar. The 81mm mortar's range varied depending on the type of shell used, up to a maximum of 3,290 yards. The minimum range was from 100 to 300 yards (depending on the type of shell) as shell fragments could inflict injury on the firer if the range was any closer. The sustained rate of fire was listed at 18 rounds per minute but as many as 30 to 35 shells per minute could be fired for short periods of time.

The Watervliet Arsenal (Watervliet, New York), the government's major producer of cannons, began initial production of the 81mm M1 mortar soon after its adoption, but mass production did not get underway until late 1939 or early 1940. Ordnance Department records indicate that only 183 81mm mortars were

(top left) WWII photo believed to have been taken in Italy picturing a mule carrying an 81mm mortar and baseplate. Such methods of transportation were used whenever possible as lugging the heavy 81mm mortar over such hilly and rugged terrain was difficult work. (U.S. Army) **(top right) Army troops transporting an 81mm mortar. The soldier at the right is carrying the tube over his shoulder and the soldier in the center is carrying the M4 mount in folded position.** (U.S. Army) **(bottom left) U.S. Army troops firing an 81mm mortar in a jungle setting during WWII. The "3 ball" baseplate is visible in this view.** (U.S. Army) **(bottom right) U.S. Marine 81mm mortar crew firing on Japanese positions on Saipan, 1945.** (U.S. Navy)

81mm mortar crew firing HE shells at German positions, France, 1944. Note the soldier on the field telephone at right. (U.S. Army)

"On Hand as of May 1, 1940."

As preparation for America's entry into the Second World War taxed Watervliet's production capacity, the Ordnance Department sought out civilian manufacturers to produce the 81mm mortar. As an Ordnance Department document pointed out,

The manufacturing problems connected with the production of our standard mortars are not difficult. Any modern machine shop accustomed to work within reasonable tolerances should be able to handle the machine work.

The government contracted with the firm of A.B. Farquhar Company, Ltd. and the Pullman-Standard Car Manufacturing Company for production of the 81mm M1 mortar.

The 81mm mortar's mount consisted of the elevating and traversing mechanism and the bipod. In the latter part of World War II, the original M1 mount was replaced by an improved version standardized as the M4. The newer M4 mount had a superior traversing mechanism and weighed the same as the M1 mount. Many M1 mounts were converted to M4 specifications during and after World War II.

The M2A3 collimator sight was adopted for use with the M1 mortar. This sight was replaced by the improved M4 which became the standard optical mortar sight of World War II. Metal Aiming Post sights (the M7, M8 and M9) were also adopted but were not widely used. While these Aiming Posts were durable and reasonably effective for short range use, they did not possess the long range capability of the optical M4 collimator sight.

The 81mm mortar could readily be transported by three men or, in a pinch, by two. A hand cart, very similar to those used with the heavy machine guns, could be utilized if the terrain permitted. During World War II, the M6A1 hand cart was classified as Standard for use with the M1 mortar and the M6 was classified as Limited Standard. A number of half-track vehicles produced by the White Motor Company were equipped with 81mm mortars and given the designation "Half Track, 81mm Mortar Carrier, M4." These vehicles could fire a volley of mortar shells and quickly move out before counterbattery fire could be brought to bear. However, these vehicles were not widely used, as stated in the Ordnance Department Technical Service volume *Procurement and Supply.*

Though standardized two full years prior to Pearl Harbor it was never in great demand. These weapons were not produced in large numbers because they lost out in competition with full-tracked antitank vehicles of greater power and cross-country maneuverability.

Very late in World War II, a modification of the M1 81mm mortar was adopted and was referred to as the universal mortar. This 81mm weapon differed from the standard M1 mortar as its barrel was shortened and the weight of the entire unit was reduced to 66.5 pounds. The shortened barrel reduced the range of the mortar and an extension tube, designated as the T1, was developed. It could be attached to the short barrel and increase the mortar's range and accuracy.

81mm Mortar Ammunition

The 81mm mortar was a versatile weapon as evidenced by the several different types of ammunition used with it.

The following types of ammunition were used with the 81mm M1 mortar during World War II.

High Explosive (HE Shells)

M43A1 Light HE. This was the lightest of the 81mm mortar shells, weighing 6.87 pounds and having a minimum range of 100 yards and a maximum range of 3,290 yards. Eighty percent of its fragments covered a radius of approximately 25 yards, which compared favorably to the 75mm howitzer. The M43A1 was equipped with a fast detonating fuze so that the shell would be certain to explode on the surface of the ground.

M45, M45B1 Heavy HE. These were the heavier HE shells used with the 81mm mortar, weighing about 10.62 pounds. The maximum range was 2,558 yards. The M45 and M45A1 shells had a bursting radius comparable to that of the 105mm howitzer. The shorter maximum range was due to the heavier weight of the shell. These shells were equipped with a delay fuze so that some penetration was possible for demolition use.

M56 Heavy HE. The M56 was the heaviest of the 81mm mortar shells, weighing some 15.01 pounds. Its maximum range was only 1,300 yards. It was equipped with a fuze which could be adjusted for either super quick or delay operation by means of a knurled knob marked "SQ" or "D".

Chemical and Gas Shells

Two types of smoke shells were loaded for the 81mm mortar: the M57 White Phosphorus (WP) and the M57 FS Smoke. Both types weighed about 10.75 pounds and had a maximum range of 2,470 yards. They were designed to lay down screening smoke. WWII Ordnance literature stated that the "Smoke shell is used primarily for hindering enemy observation, either to reduce effectiveness of hostile action, or to conceal movements of friendly troops." As was the

case with the WP grenades discussed previously, the M57 WP shell also had some antipersonnel applications. The M57 FS shell was loaded with a composition of sulphur trioxide and chlorsulfonic acid, which produced a dense white smoke. The 81mm mortar did an excellent job in this role.

The 81mm WP round often proved to be an effective weapon as well as a smoke producer. A Marine Corps report on the fighting on Okinawa stated that

...a Battalion 81mm mortars blistered the village with a barrage of white phosphorous shells, burning to the ground all buildings still standing.

A seldom used shell was the "M57 HS Persistent Gas" shell loaded with an irritant tear gas filler. The use of this shell had limited applications in combat.

81mm Illuminating Shells

In addition to firing the various types of high explosive and smoke shells, mortars were often used to launch illuminating projectiles. Such illuminating projectiles proved quite valuable, especially in the Pacific, because searchlights were too easy to knock out and flares dropped from aircraft revealed not only the position of the enemy, but also the position of friendly troops. Illuminating shells were developed that could be fired from mortars. These shells contained an illuminating compound that burned brightly (about 275,000 candlepower) for about 60 seconds and had a range of about 2,200 yards. The projectile was attached to a parachute, which slowed the descent of the illuminate and increased its effectiveness. The most widely used 81mm illuminating projectile during World War II was the M301, which used the M84 time fuze. This fuze could be adjusted from five to 25 seconds before the priming charge was detonated, and this released the illuminating flare and parachute.

The illuminating mortar shells proved to be a valuable tool in reducing nighttime infiltration tactics, spotting enemy troops movements and detecting targets for artillery fire.

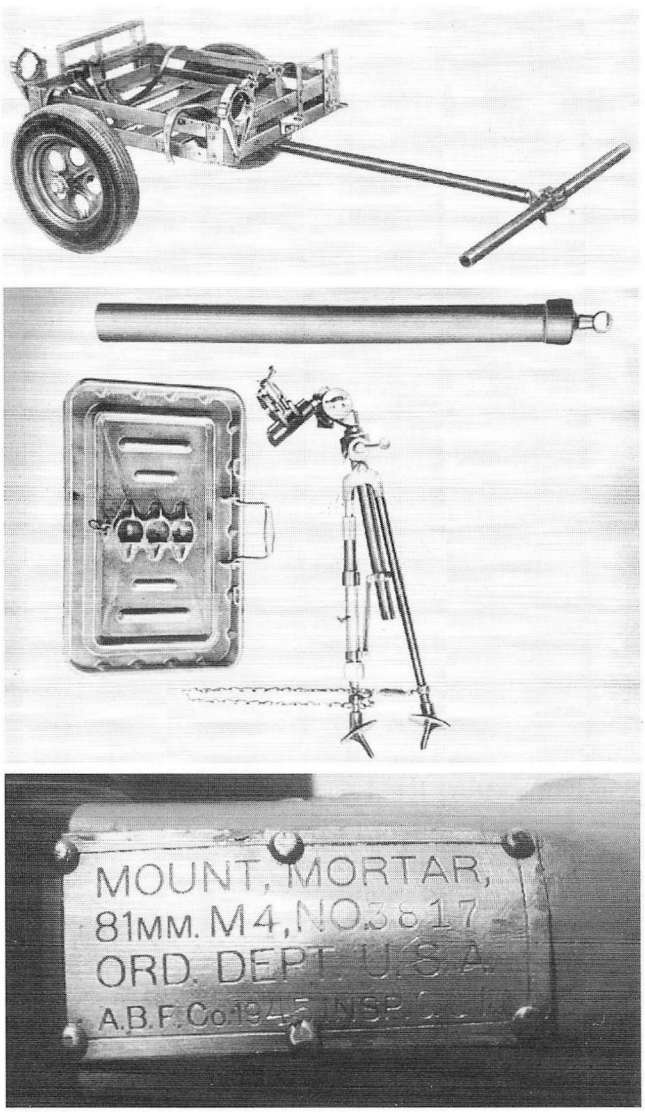
Practice and Training Shells

There were three basic types of 81mm practice shells: the M43, M43A1 and M44. These shells were the same size as the light HE round. Rather than an explosive charge, they were loaded with sand to simulate the correct weight and employed a small spotting charge so that its impact could be more readily observed. The range was approximately the same as that of the light HE shell.

The M68 Training Shell was inert, containing neither a propelling nor spotting charge. Its purpose was to train troops in the proper procedures of inserting the shell into the mortar barrel.

U.S. mortar ammunition was issued assembled as complete rounds with the maximum number of powder increments attached. These were removed as necessary to achieve the desired range. While this system worked relatively well, some problems were encountered with the exposed powder increments, particularly in the Pacific. This is illustrated in *Shots Fired in Anger.*

...part of the mortar round which was to cause trouble- -the relatively exposed propellent powder



(top) M6A1 hand cart. This cart was used to transport the M1 81mm mortar when possible. However, terrain often prevented the use of hand carts, and mortars and other weapons frequently had to be transported by hand. (TM 9-2200) **(center) 81mm mortar, M1, broken down into its three basic components for transporting.** (U.S. Army Aberdeen Proving Ground Photo/courtesy Konrad F. Schreier, Jr.) **(bottom) Data plate for M4 mount used with the 81mm mortar. This example was made in 1945 by the A.B.F. Company.** (Robert G. Segel Collection)

81mm mortar being fired from the back of a half-track. Mounting mortars in such vehicles provided mobile fire support for the infantry. The soldier at right has an M1917 .45 cal. revolver on his belt. This was a widely used weapon among mortar crewmen during World War II. (U.S. Army)

increments. This propellent charge was not in a powder form at all, but in the form of celluloid strips, cut and sewn into little waferlike packets. These had to be exposed on the outside of the shell in order to be handled and they had to be attached near the tail to facilitate their ignition from the basic charge, so they were shipped out just that way—in cardboard containers, handy but not weatherproof.

Improper functioning often occurred as the powder increments became wet. When this happened, the range was severely reduced and rounds could fall short. This sometimes led to fatal results, as shorts could easily fall into friendly troops manning front line positions. Col. John George reported that the problem on Guadalcanal with moisture saturated mortar shells became so serious that

A few commanders silenced their mortars entirely, having lost all confidence in them. Investigations were made and it was learned that the whole trouble had been caused by the effect of moisture on the propellent increments. Some of them had failed to ignite—had, in fact, remained attached unburned to the shell, being discovered at the site of the short explosion. It was only a few days before Ordnance straightened the matter out and issued orders for the disposal of increments which had been darkened with moisture.

Mortar crew cleaning the tube of their M1 81mm mortar, Europe, 1945. (U.S. Army/Konrad F. Schreier, Jr.)

Requirements for the 81mm M1 mortar were fairly constant throughout the war. By early 1944, production had satisfied the projected requirements but the German offensive in Europe in late 1944 resulted in an unexpected increase in demand. However, the firms involved in production of the 81mm mortar were able to cope with this increased demand with little trouble.

Just prior to our entry into World War II, the Table of Organization and Equipment (TO&E) for a U.S. Army "Triangular" Infantry Division (three regiments) called for 18 81mm mortars, while 48 81mm mortars were authorized for the "Square Division" (four regiments) and 20 81mm mortars for an Armored Division. The number of 81mm mortars varied in the smaller units (Regiments and Battalions) depending on their formation (regular infantry, motorized infantry, airborne, etc.). Table #39 gives the authorized allowances of 81mm mortars during World War II.

The various Marine Corps Divisional TO&Es from 1942 through 1945 called for an authorized allowance of 36 81mm mortars. Each Marine Battalion had a Heavy Weapons Company with 81mm mortars to provide fire support for the battalion.

Due to the nature of fighting in the Pacific, the 81mm mortar was used as a substitute for artillery by both the Army and Marine Corps more often than was done in Europe, which sometimes resulted in the weapon being in short supply. An Ordnance Department report detailed the shortage of mortars on Okinawa:

On 9 May a hundred 81mm...mortars were requested from Oahu and the entire reserve stock of twenty-seven 81mm mortars on Saipan was called forward, all shipments to be made by air. All of the Saipan mortars were on Okinawa four days later, those from Oahu in about ten days. For this quick reaction two infantry commanders expressed great satisfaction and thanks.

There are many examples of the effectiveness of the 81mm mortar during World War II found in Army and Marine Corps reports. An illustrative example regarding the 81mm mortar's performance on Guadalcanal appears in the book *A Special Valor.*

A mortar crew on the ridge spotted four men in a group, one carrying a flag and the others marching with heads bent forward and bayonets poised. The range was judged to be 200 yards; the tube's slant was adjusted and a shell dropped in. Making its characteristic plunk and leaping high into its

World War II ordnancemen at Aberdeen Proving Ground firing a test with a standard 81mm M1 mortar. Since they have not bothered to mount the sight on the mortar, this is probably some kind of fuse testing.

(U.S. Army Aberdeen Proving Ground photo, c.1943/courtesy of Konrad F. Schreier, Jr.)

high arc, the missile scored a direct hit. When the smoke and dust cleared, according to one of the mortarmen, "there was no more flag and no more Japs."

Another anecdote concerning the mortar on Guadalcanal appears in the book *Starvation Island.*

Kelly had only one 81mm mortar along and only fifty rounds of 81mm ammunition. This was in the hands of M/Gy Sgt. Ray Fowel, a mortarman of legendary stature. Kelly gave Fowel a free hand to fire at targets of opportunity, both at the Japanese passing eastward along the Government Track and those deploying against Hill 84. Some of the rounds were placed on target so close to the hill—within 200 yards—that the mortar had to be held steady in an absolutely vertical position by a Marine lying on his back with his feet braced against the tube.

There are numerous instances found in Army and Marine documents relating to frequent shortages in mortar ammunition among combat units. The allocated unit of fire for a 81mm mortar for the Marine Corps during World War II was 275 rounds. This often proved to be inadequate, as confirmed in a volume of the *Marine Corps History of Operations,* which stated that "The units of fire tables.....did not provide enough mortar ammunition."

This was echoed in another Marine report pertaining to the fighting on Iwo Jima which revealed that

Under cover of darkness, critical items, especially 81mm ammunition, were brought in. The 81mm shells that had been hand-carried ashore with these mortars had lasted for only one hour after the mortars opened fire.

A U.S. Army Ordnance Technical Services report that discussed the Army's involvement on Okinawa

related that "Certain types of mortar shells continued to be the most critically short ammunition items of the campaign." The report went on to state that: "...268,904 rounds of 81mm mortar ammunition" had been expended on Okinawa by mid-May, which was six times the amount fired during the first six weeks of the previous Leyte Campaign. Ordnance reported that stocks of 81mm ammo were "....running alarmingly low" and urgent requests for shipments by air were made. It was reported that when 36,000 rounds were delivered by the Army's Air Transport Command, "....combat troops cheered loudly when told of their arrival."

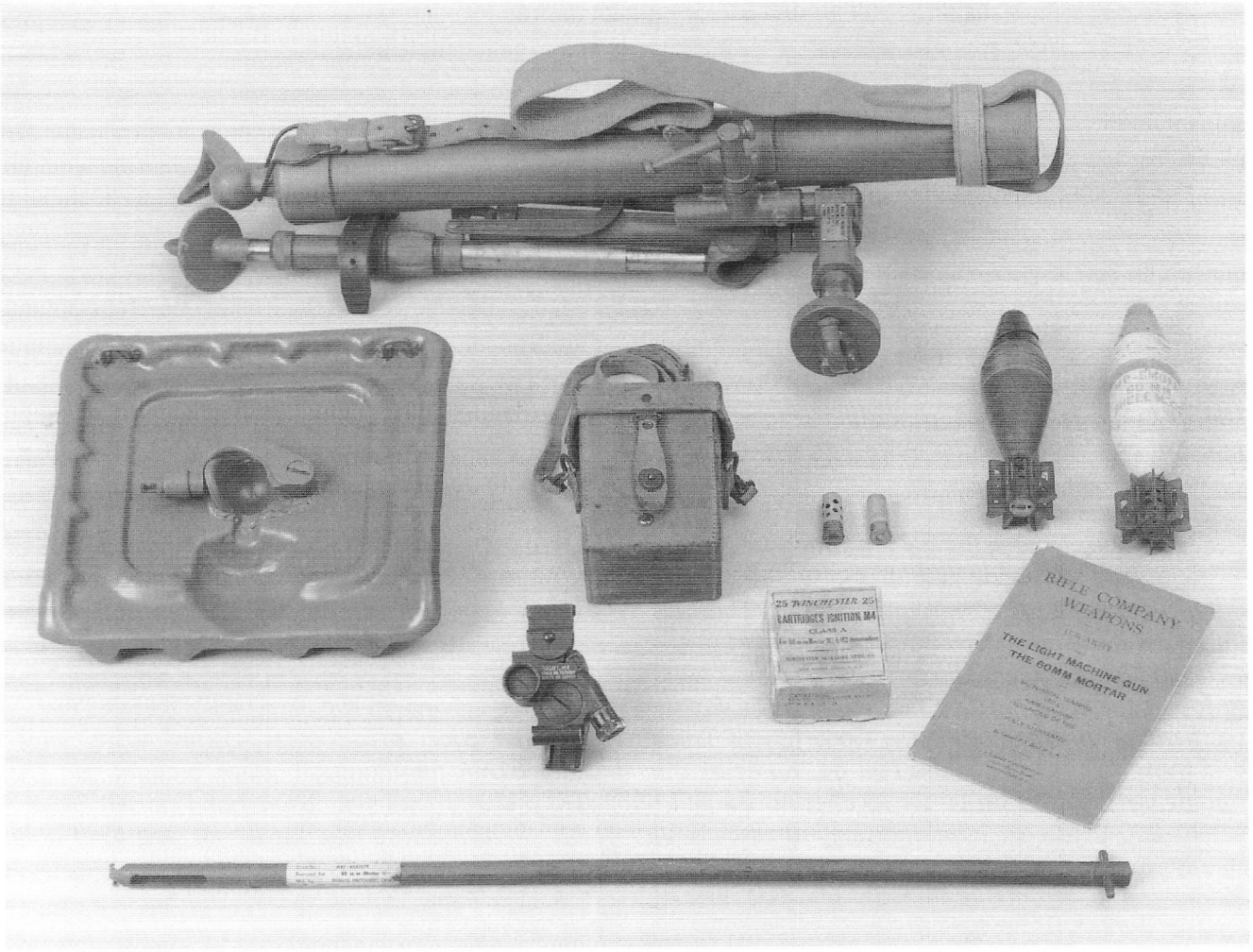
The 81mm mortar was among the most powerful infantry weapons available. The American GI appreciated the 81mm mortar as much as the Germans and Japanese despised it. It is interesting to note that the Japanese and Germans used similar Stokes-Brandt 81mm-type mortars. There are some instances of U.S. troops using captured enemy mortar shells in their M1 mortars.

Numerous Army and Marine reports refer to the 81mm mortar as "the infantry's artillery," which aptly sums up the usefulness of the weapon.

60mm M2 Mortar

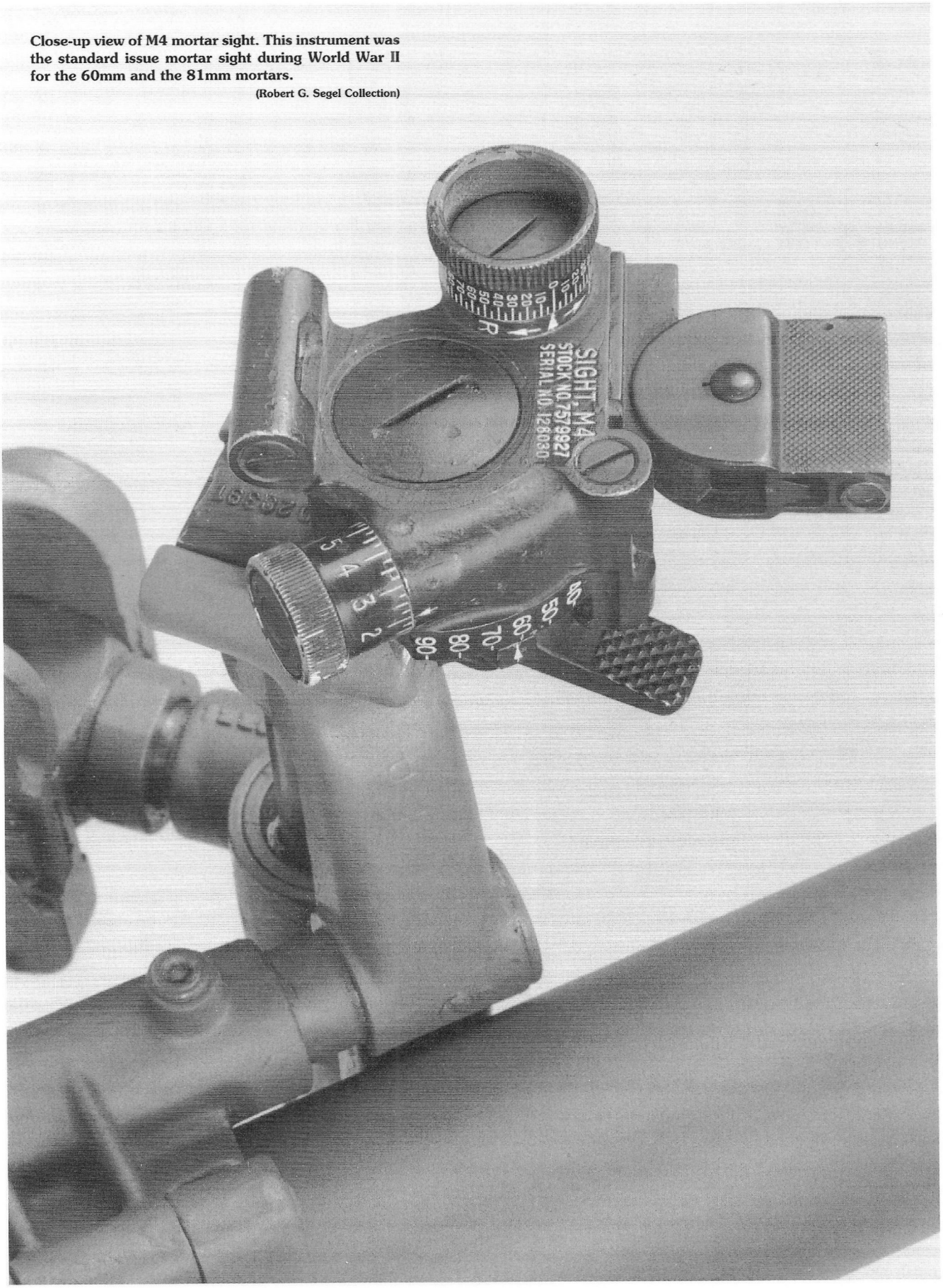
To digress a bit, as the 81mm mortar was being tested in the late 1930s, the two major branches of the Army, the Infantry and Cavalry, found it to be a very good weapon. However, both branches believed that many missions did not require such a large and heavy weapon and requested a smaller and lighter version of the mortar. Veterans of the First World War recalled that some difficulties had been experienced with the Stokes mortars and their ammunition keeping up with the troops during the rapid movement toward the Rhine in October of 1918.

60mm mortar and accessories. The M5 mount is in the folded position and a web carrying sling is attached to the mortar tube. The baseplate is at the left. Accessories include the M4 leather carrying case for the M4 sight, two rounds of M4 ignition cartridges, an M19A2 HE round, an M302 WP round, a box of 25 M4 ignition cartridges, a 1941 manual, M4 mortar sight and an M9 cleaning staff. (Robert G. Segel Collection)



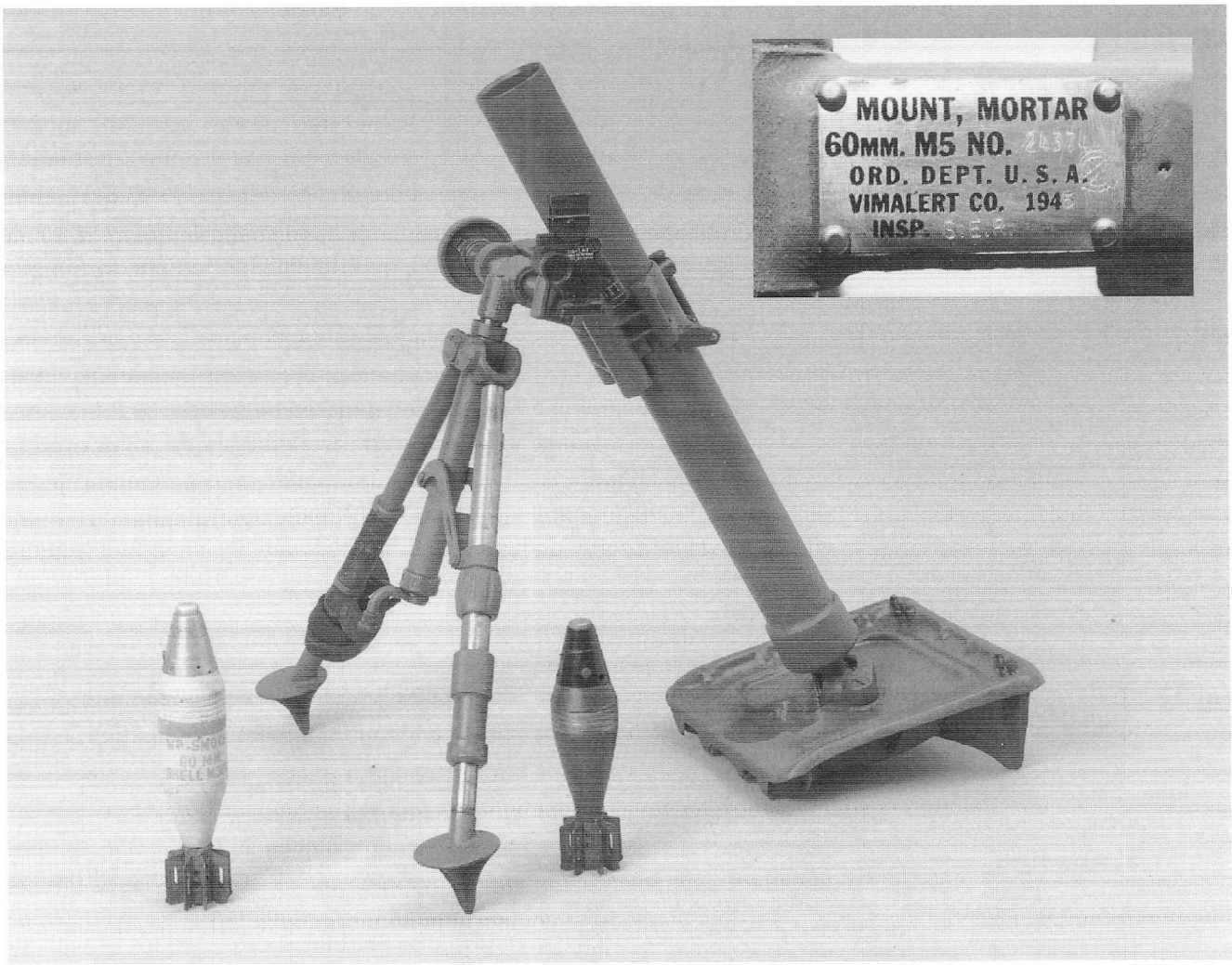
Close-up view of M4 mortar sight. This instrument was the standard issue mortar sight during World War II for the 60mm and the 81mm mortars.

(Robert G. Segel Collection)



(left) Pre-1942 photograph of Army troops firing a 60mm mortar. While having less power and range than its bigger 81mm counterpart, the 60mm could be brought into action quickly to provide fire support to front line troops. (U.S. Army)

(top left) A U.S. Army 60mm mortar squad, ETO. The soldier in the middle background is carrying an M2 60mm mortar with bipod and baseplate over his shoulder and a mortar round in his left hand. This vividly illustrates the portability of the 60mm mortar, which was its prime asset. Other squad members are providing fire support if necessary. (U.S. Army) **(top right) Early World War II photograph of U.S. ski troops training with a 60mm mortar.** (U.S. Army) **(bottom left) Army sergeant demonstrating the technique of firing a 60mm mortar without a mount, sight or baseplate. While using the mortar in such a manner had the advantage of extreme portability, accuracy was greatly reduced.** (U.S. Army) **(bottom right) A WW II 60mm mortar crew having chow. Note the leather muzzle cover on mortar.** (U.S. Army)



60mm M2 mortar manufactured in 1942. The mortar is equipped with the standard M4 sight, M5 mount and baseplate. A White Phosphorus (WP) round and a High Explosive (HE) round appear in the foreground. The 60mm mortar saw extensive use in World War II and was a workhorse of the infantry. The inset shows the data plate for the M5 mount used with the 60mm mortar. This example was made in 1945 by the Vimalert Co. (Robert G. Segel Collection)

A weapon for use between the effective ranges of hand grenades and the 81mm mortar was desired. The Ordnance Department requested that the Brandt Company produce a 42mm mortar for testing, but before a pilot model was produced, Brandt provided a 47mm version for demonstration. This weapon was tested instead, but it did not prove powerful enough. Consequently, the Ordnance Department acquired eight 60mm mortars from Brandt, which were extensively tested by both the Infantry and Cavalry Boards. In February of 1938, the Army rejected the 47mm mortar and adopted the 60mm. The Brandt Company used the model number M1 on the eight 60mm mortars acquired from the firm by the Army and the weapon was initially adopted as the M1 by the United States. However, this designation was soon changed to "Mortar 60mm, M2 and Mount M2" to prevent confusion with the 81mm M1 mortar. The Watervliet Arsenal began work on production drawings and specifications required to convert the French metric measurements to American measurements.

In January of 1940, an order for 1,500 60mm M2 mortars was placed with the Read Machinery Company of York, Pennsylvania. As requirements for the 60mm mortar increased rapidly during 1940, a second contract for the weapon was given to the Danville, Pennsylvania firm of Kennedy-Van Saun Engineering and Manufacturing Company. These two firms produced just over 30,000 60mm mortars until requirements were met in early 1944. As was the case with the 81mm mortar, the unexpected increase in demand from the European theater in late 1944 resulted in an unforeseen need for more 60mm mortars. The Ordnance Department responded to the crisis by giving additional contracts to Read and Kennedy-Van Saun. To further boost production, the Firestone Tire and

(top) A World War II mortar crew sighting an M2 60mm mortar by means of the M4 sight. Note the soldier at left is wearing a vest designed to carry mortar shells. Close observation will reveal the butt of his M1917 .45 cal. revolver. (U.S. Army)
(bottom) Early World War II photo of a 60mm mortar crew in a dug-out position. The soldier at left has just dropped a shell in the tube. (U.S. Army)

Rubber Company was given an order in late 1944 for 24,250 M2 mortars. It is interesting to note that the production of 30,152 60mm mortars during the first eight months of 1945 nearly exceeded the total production since 1940.

The 60mm M2 mortar was very similar to the 81mm M2 in design and construction other than the obvious differences in weight and size. The method of operation of the two mortars was identical. The complete M2 60mm mortar and M2 mount weighed 42 pounds, about a third of the 81mm. The overall length of the M2 mortar was 28.6 inches. Like the M1 mortar, the M2 could be broken down into the three basic units: the barrel (12.8 pounds), the bipod (16.4 pounds) and the base plate (12.8 pounds). The bipod mount was often left attached to the tube so the mortar could be brought into action faster and could readily be transported by two men.

Later in World War II, a redesigned mount was adopted as the M5. The M5 had an improved traversing and shock absorbing mechanism. In addition, the M5's bipod was equipped with a modified locking sleeve to eliminate the M2 mount's tendency to slip.

The 60mm mortar used the same type of sights as the 81mm M1, with the M4 collimator being the standard issue for most of World War II. The 60mm mortar had a sustained rate of fire of 18 rounds per minute but could be fired for shorter periods of time at 30 to 35 rounds per minute.

When the 60mm mortar began to see combat use in World War II, many of our infantrymen harbored some doubts concerning its effectiveness given its much smaller size and weight as compared to the 81mm mortar. General G.M. Barnes recalled how these doubts were soon put to rest.

These arguments continued until on one occasion the Japanese captured a number of 60mm mortars and ammunition and used them against our troops. The fire was so deadly that the efficiency of the mortar and its ammunition was never again questioned throughout the war.

The 60mm mortar saw extensive service in all theaters during World War II. A few problems were encountered in the Pacific when the mortar was used in thickly vegetated areas. The 1943 Marine Corps report on weapons used by a Raider detachment on New Georgia Island reported,

Mortar, 60mm. An excellent and accurate close support weapon, where it can be used, but due to the density of jungle overhead cover, these times were few.

60mm M19 Mortar

The successful use by the Japanese of their "knee mortar" resulted in some modifications of the 60mm mortar in an attempt to come up with a similar type of weapon. The Japanese knee mortar was actually a grenade launcher with a curved base plate. Americans who encountered this unusual weapon initially assumed that the base plate was designed to brace against the firer's knee. In actuality, using it in such a manner would have resulted in a broken leg. The Japanese knee mortar was effective at the short ranges typically seen in jungle fighting, but its grenade was much less powerful than the 60mm mortar shell.

In order to lighten the M2 mortar and bring its weight down as much as possible, the tube was occasionally removed from the mount and the mortar fired by dropping in a shell while holding the tube by hand. There have been a few recorded instances in which mortars were successfully employed in this manner. One such incident is related in the book *Band of Brothers.*

Malarkey found his mortar tube, but not the base plate or tripod (sic). Setting the tube on the ground, he fired a dozen rounds toward the Manor. Guarnere joined him, working another mortar tube. They discovered later that every round hit its target. "That kind of expertise you don't teach," Winters commented. "It's a God-given touch." When Malarkey ran out of mortar rounds, his tube was almost completely buried. An old French farmer got a shovel to help him dig it out.

The above passage notwithstanding, the mortar was rarely used in such a fashion as any sort of reasonable accuracy was extremely problematical when the weapon was used without the mount and sight.

In order to improve this situation, the M19 60mm mortar was standardized later in the war. The M19 consisted of the standard M2 60mm mortar barrel with a base cap that contained a specially designed trigger mechanism. This trigger mechanism was activated by a lanyard and permitted the mortar to be lever fired rather than drop fired, as was done with the standard mortar. This resulted in better accuracy than simply using the standard mortar in the drop fire mode, but the lack of sights and a steady base made it less effective than the M2 mortar. The M19 was not fielded in extremely large numbers because it was not accurate at ranges much beyond 200 yards. Its compactness and light weight made it a useful weapon in certain types of close range combat, but the standard M2 mortar with either the M2 or M5 mount and collimator sight was much more accurate and deadly to the enemy.

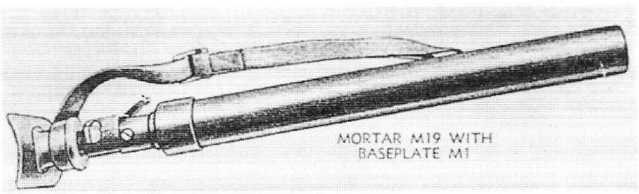


Illustration in TM 9-2300 of a 60mm M19 mortar and "M1" baseplate. The M19 was not equipped with a bipod as was the standard M2 60mm mortar and was trigger-fired rather than "drop fired" in the conventional manner.

T21E1 60mm Mortar

In early 1944, a project to develop a "Trigger Operated, Shoulder Type" 60mm mortar was instituted. This project was conducted by the Springfield Armory and the weapon was designated as the T21E1. The purpose of this weapon was to enable the mortar to fire in a flat trajectory manner on direct fire targets. Some of these weapons were fielded late in the war and saw combat with the Marines in the Western Pacific. The *History of Marine Corps Operations in World War II* reported that

...(Another) new weapon was the 60mm shoulder mortar, adapted to fire from a light machine gun mount and designed for flat trajectory fire against pillbox and cave openings. Some of its parts, however, proved too weak to stand the rough wear and tear of combat, and Marines who had to lug the weapon around complained of its heaviness. Even more serious was the recoil, which was so severe that the gunner had to be relieved after firing only two to four rounds. Since the new weapon's function duplicated that of the bazooka....Marines were inclined to hold the shoulder weapon in less regard than the older and more familiar weapon.

The M19 and the shoulder fired 60mm mortar saw very limited use when compared to the standard M2 mortar.

General G.M. Barnes correctly stated that "The 60mm mortar as used in this war was a highly effective and versatile infantry weapon. Its principal value lay in the great firepower which it could produce for such a light weapon."

The 60mm mortar's size and weight were indeed the keys to its success during the war. Its range and power were certainly less than that of the 81mm mortar, but this was often an adequate trade-off in having

a weapon that could keep up with rapidly moving troops. The 60mm mortar could be brought into action very quickly to provide valuable fire support during the important first few minutes of an infantry engagement when larger weapons, such as the 81mm mortar, would not yet be available. The value of the 60mm mortar in such applications is illustrated in a Marine Corps report in the Western Pacific.

The success of the 28th Marines' attack owed much to the support provided by the 60mm mortars which maintained continuous fire against groups of Japanese that had been flushed out of their emplacements. This fire kept the enemy on the run and out in the open, where he presented a visible target to the advancing riflemen.

The 60mm mortar's contributions were not limited to firing high explosive shells. As was the case with the 81mm mortar, the 60mm was often called upon to fire illuminating shells during nighttime engagements. These excerpts from a World War II Marine Corps document are typical.

Where the light shed by the naval flares seemed dim to frontline commanders, 60mm mortars were called on to throw up additional illumination shells...To aid local defenses, 60mm mortars of the rifle companies kept flares overhead wherever the front line was threatened.

60mm Mortar Ammunition

Compared to the 81mm mortar, the 60mm utilized fewer different types of ammunition. The WWII 60mm mortar shells were the High Explosive (HE), Smoke, Illuminating and Training rounds.

High Explosive

The most widely used type of 60mm mortar shell was the M49A2 high explosive shell. This shell weighed 3.07 pounds and had a maximum range of 2,017 yards, although its accuracy was reduced at ranges beyond 1,000 yards. Its muzzle velocity was 535 feet per second. The 60mm HE round was a good performer within its range limitations and very large numbers were produced during the war.

Smoke

The M302 WP was the most common smoke round fired from the 60mm mortar during World War II. As with the other types of white phosphorus grenades and mortar shells, the M302 had value as both a smoke producer and a casualty-inducing weapon. This round weighed 4.02 pounds and produced a muzzle velocity of 439 feet per second.

Illumination

As discussed, the 60mm mortar was frequently called on to fire illumination rounds. The most common 60mm illuminating round was the M83. The 60mm illuminating shell weighed 3.7 pounds and was 14.28" long. Its range was about 1,000 yards with an altitude of approximately 800 feet. The illuminate burned for about 25 seconds and produced 145,000 candlepower. As with the 81mm illuminating shell, the 60mm type used a parachute to slow its descent and it fell at a rate of about 10 feet per second.

Training

The M69 training round was used for practice and training with the 60mm mortar. This shell had the same configuration, weight and range as the M49A2 HE round and approximated its range. The M69 did not contain a high explosive charge, which enabled troops to be safely trained with the 60mm mortar.

Unlike the 81mm mortar, the number of 60mm mortars in Army and Marine Corps units varied widely during the course of the war. On the eve of World War II, a Triangular Army Infantry Division was authorized 81 60mm mortars, a Square Division had 108 and an Armored Division 21. As the war progressed, the official allowances of 60mm mortars was increased. Table #40 gives the authorized allowances for 60mm mortars during World War II.

The Marine Corps Divisional TO&Es changed the allowances for 60mm mortars from 63 in 1942 to 81 in 1943 and 117 for 1944 and 1945. The typical Marine company had a weapons platoon and a headquarters company that were equipped with 60mm mortars. The authorized unit of fire for the 60mm mortar was 275 rounds, but, as with the 81mm mortar, this often proved to be inadequate.

Like its larger 81mm counterpart, the 60mm mortar was a versatile and reliable performer and was, without question, a key infantry weapon of World War II.

Other World War II Mortars

Although the 60mm and the 81mm mortars represented the overwhelming majority of such weapons used by the U.S. armed forces during World War II, there were a few other types of mortars that saw service as well. Since these other types were much larger and heavier than the 60mm and 81mm mortars, they generally were employed in a manner similar to artillery and do not fit into our definition of infantry weapons. However, these other mortars will be briefly profiled in order to complete the story of the World War II mortars.

A blurry but interesting photograph of a 4.2" Chemical mortar crew firing HE shells in Italy, 1944. (Chemical Warfare Service)

4.2" Chemical Mortar

The 4.2-inch chemical mortar was a multiple purpose weapon whose roots go back to the gas warfare of the First World War. Several methods of delivering gas were used during World War I. The British Stokes mortar was sometimes used for this purpose, but the liquid filled gas shells tumbled when fired in the smooth bore mortar and this severely limited their range and accuracy.

After World War I, the Army's Chemical Warfare Service began work on an improved mortar designed to fire chemical and gas shells. In 1924, a 4.2 inch mortar with a rifled barrel was developed. The rifled bore prevented the shells from tumbling and increased the effective range to some 2,000 yards. Further refinement resulted in the adoption of the M1 4.2-inch chemical mortar in 1928.

However, the War Department showed little interest in the chemical mortar and its manufacture was suspended in 1935. In September of 1941, the 81mm mortar was authorized for use by the Army's chemical battalions despite the 4.2" mortar's superiority as a gas delivery weapon.

With America's entrance in the Second World War imminent, the War Department authorized two battalions of troops to be equipped with the 4.2" chemical mortar. The original M1 chemical mortar was slightly redesigned to increase its range to 2,400 yards, and the new weapon was standardized as the M1A1 chemical mortar. Further testing revealed that if the powder charge was increased by 50 percent, the chemical mortar's range would be extended to 3,200 yards. However, the barrel used on the M1 and M1A1 chemical mortars could not safely handle the additional pressure and a stronger barrel and baseplate were adopted. The new chemical mortar was designated as the M2. Both the M1A1 and M2 chemical mortars were to see service through the end of the war.

Two firms, the Bell Machine Company of Oshkosh, Wisconsin, and the Oakes Products Division of Houdaille-Hershey Company of Decatur, Illinois, were awarded contracts to produce chemical mortars. The Bell Company manufactured the barrel and the Oakes Company made other component parts.

As the M2 chemical mortar was being developed, it became apparent that the weapon was capable of doing more than firing smoke and toxic gas shells. In April of 1942, the Chemical Warfare Service requested permission from the Services of Supply for the chemical mortars to fire high explosive shells. It was felt that the employment of the chemical mortars in such a way would add to the weapon's overall usefulness. Many infantry officers were initially skeptical of the Chemical Warfare Service becoming involved in providing fire support. It has been reported that "...the general impression of most ground force officers was that the functions of the CWS were confined to gas and gas masks and smelly clothing." However, the performance of the 4.2" chemical mortar was enough to overcome any resistance and permission to employ the mortar in such a role was forthcoming.

Although the chemical mortar's primary mission was to fire screening smoke shells, the weapon also saw a great deal of service during the war firing HE shells. The 4.2" chemical mortar first saw combat use during the invasion of Sicily in the summer of 1943 and its use in delivering high explosive shells was impressive. A Chemical Warfare Service report stated that "....there was no question that the CWS had taken the right course in turning the chemical mortar into a HE delivery weapon." The weapon was used in Europe and the Pacific. Some 41,452 4.2" chemical mortars were procured from December of 1941

Ordnance troops in the Pacific sorting a variety of mortars and .30 caliber machine guns. (U.S. Army)

through December of 1945. The weapon enjoyed popularity with both Army and Marine Corps units. The Ordnance Department volume *On Beachhead and Battlefront* mentions that the "Chemical Warfare Service's 4.2 inch rifled mortar was extensively used and was a great favorite with the marines."

4.2" Chemical Mortar Ammunition

The chemical mortar fired a wide variety of ammunition including two types of high explosive shells. The M3 HE round weighed 24.5 pounds, and the M4 HE round weighed 32 pounds. The various types of chemical and gas shells weighed between 24.25 pounds and 25.5 pounds. These included white phosphorus and several types of irritant and screening gases.

While it was useful in supporting the infantry by firing both gas and high explosive shells, the chemical mortar was not as versatile as the 60mm and 81mm mortars due to its size and weight. As assembled, the weapon weighed 333 pounds, which was well over twice the weight of the 81mm mortar. Although the chemical mortar could be broken down into three basic units—the M2 barrel (105 pounds), the M1 mount (53 pounds) and the M2A1 base plate (175 pounds)—each unit was too heavy to be carried by one man for any distance, which could be done with the 81mm mortar. Various types of hand carts, mule packs, landing craft and motor vehicles were used to transport the chemical mortar. The most common means of transport was by either a jeep-towed ½-ton trailer or a ¾-ton weapons carrier.

Although a useful and effective weapon, the 4.2" chemical mortar saw less use than did the 60mm and 81mm mortars as an infantry support weapon during World War II due to its weight when compared to the smaller and more portable mortars. However, after the war, the Ordnance Department recognized the value of the heavy mortar as a support weapon and development of an improved version was carried out. The basic 4.2" mortar design was refined and was eventually standardized in 1951 as the M30. The modified 4.2" mortar filled the gap between the infantry's 81mm mortar and artillery, which was essentially the role it played during World War II.

Other Mortars

The effective use of the 4.2" chemical mortar in firing high explosive shells resulted in the development of even more powerful mortars. Although much larger and heavier than the standard 60mm and 81mm infantry mortars, such weapons were still much more portable than even the smallest artillery field pieces. According to the Ordnance Department volume *Procurement and Supply,* these "...were designed to meet the needs of troops in the South and Southwest Pacific Areas for mortars light enough to be carried forward through the jungle by infantry yet powerful enough to blast prepared enemy positions at fairly long range." The phrase "carried forward through the jungle" is perhaps a bit misleading because such transportation required a number of people and some type of cart or vehicle. However, such mortars were indeed much more portable than a 105mm or 155mm artillery piece.

Two heavy mortars of this type were fielded during the war in limited numbers. They were not standardized and retained their T designations throughout the war. Although perhaps closer in tactical use and employment to artillery, these two weapons will be briefly profiled in order to complete the chronicle of the World War II mortar.

105mm Mortar, T13

The T13 105mm mortar was developed to provide the equivalent of artillery fire support until regular artillery field pieces could be employed. This weapon

fired a 26-pound high explosive shell and had a maximum range of approximately 2,000 yards.

The T13 mortar and its T12 mount resembled an over-size 81mm mortar with an elongated tube. The 105mm mortar with its mount and baseplate weighed almost 200 pounds which obviously limited its portability as compared to a 60mm or 81mm mortar. On the other hand, the T13 mortar weighed but a fraction of the standard 105mm howitzer.

The T13 105mm mortar was used during the latter stages of the war, primarily, if not exclusively, in the Philippine Campaign. From all accounts, it fulfilled its intended purpose in a very satisfactory manner although its actual employment was quite limited.

155mm T25 Mortar

Another weapon designed to increase the fire support for infantry troops was the T25 155mm mortar. This weapon fired a 60-pound shell (designated as the T26E1 HE) to a maximum range of some 2,500 yards with remarkable accuracy. The T25 mortar, including its T16E2 mount and T2E2 baseplate, weighed approximately 600 pounds.

The 155mm mortar was first employed in combat by the 37th Infantry Division in the campaign to retake the Philippines. General G.M. Barnes relates one example of the weapon's effectiveness near Bagabag.

...the mortar was emplaced 50 yards behind the front lines and various point targets were fired on from 400 to 800 yards range. During this period, direct hits on five houses and a light tank were observed. All six targets were destroyed.

The T25 mortar saw very limited use in what essentially amounted to field testing. Had the weapon been available earlier in the war, it undoubtedly would have proven to be a valuable weapon. An Ordnance Department report stated that

Observers believed that the 155mm mortar developed by Ordnance in its jungle warfare program would have been most effective; however, this remained speculation, for none were available. Since the 155 was lacking, the cry arose for more 81mm and 60mm mortars.

While the 4.2" chemical mortar and the 105mm and 155mm mortars were powerful and potent weapons, their size and weight precluded their use as infantry weapons, unlike the 60mm and 81mm mortars. The larger mortars were a bridge between the smaller mortars and artillery pieces. When the subject of infantry mortars of World War II is discussed, the 60mm and 81mm weapons are, rightfully, the primary focus.

Collector Notes

Collector interest in the 60mm and 81mm mortars seems to parallel that of the bazooka. Like the bazooka, the various types of mortars are classified as Destructive Devices and subject to stringent regulations.

Relatively few M1 81mm and M2 60mm mortars have been registered as compared to machine guns. Even demilled mortars were not extremely common until just a few years ago. Fairly large numbers of 81mm and 60mm mortars supplied under military assistance programs to several foreign countries became available on the world market. Since these 50-year-old mortars would have little use as military weapons today, many were sold to enterprising dealers to be imported back into the United States for their intrinsic collector value. However, since registration of such weapons was no longer possible, the mortars had to be demilled to remove them from classification as Destructive Devices. The demill process typically consists of milling a large hole (at least equal to the bore diameter) in the lower portion of the tube, welding one or more metal cross bars inside the tube and welding the base on to the tube. Thus modified, the mortars are no longer classed as weapons and are as legal to own (from a Federal law standpoint) as scrap iron.

Such modified 81mm and 60mm mortars remain relatively available today although prices are not particularly cheap. Baseplates, mounts and M4 sights are also around in reasonable numbers but are not as common as the demilled mortar tubes.

The mortar tube was marked with the serial number, the initials or the name of the manufacturer and the date of production. For example, the M1 mortar pictured on page 241 is marked "PSCM CO. 1943", which indicates that it was manufactured by the Pullman-Standard Car Manufacturing Company in 1943. The M2 mortar on page 251 is marked "Read CO. 1942" and was made by the Read Machinery Company in 1942.

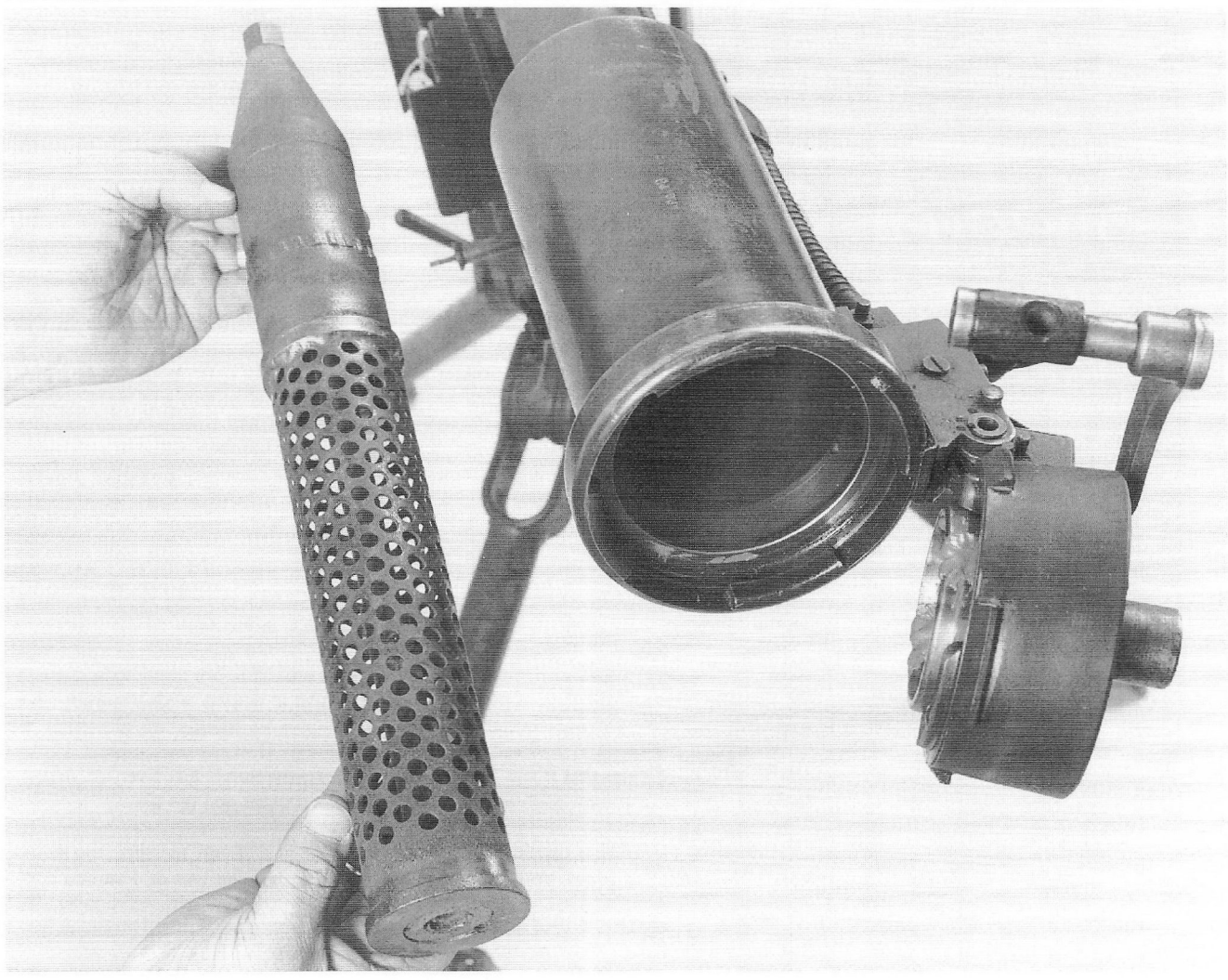
The mount had an attached data plate that carried the name of the manufacturer and the date of production in addition to the mount's serial number. The baseplate was also marked with a serial number but few were stamped with the maker's name or initials. The M4 sight was serially numbered and issued with a leather carrying case. It should be noted that neither the mount's or sight's serial number bore any relation to the mortar tube's serial number.

Other accessories produced for the World War II mortars were wood cleaning staffs, web carrying slings, leather and canvas muzzle covers, field manuals and several other items. All of these are interesting and colorful additions to a mortar in a collection.

Inert 81mm and 60mm mortar shells are also around in fair numbers today and are a must to display with a mortar. Live high explosive rounds are classified as Destructive Devices and subject to the same restrictions as live grenades, bazooka rockets and the like.

Very few 4.2" chemical mortars or 105mm and 155mm mortars are available today in either live or demilled configuration. They would, of course, be subject to the same restrictions as the other types of mortars.

M18 57mm recoilless rifle mounted on an M1917A1 machine gun tripod. This weapon saw limited but effective use late in World War II, but was withdrawn from service several years later. Below is shown a close-up view of the M18's breech mechanism. The round is a "sub-caliber" practice type that allowed a .30 carbine cartridge to be fired in the recoilless rifle.
(Hayes Otoupalik Collection)



Recoilless Rifles

One of the most interesting and technologically advanced infantry weapons developed by the Ordnance Department during World War II was the recoilless rifle. Recoilless rifles saw limited—but extremely effective—use in the last year of the war. Recoilless rifles were capable of firing artillery-type shells at velocities and with an accuracy comparable to those of standard guns, but almost entirely without recoil.

This remarkable performance was due to the unique design of the recoilless rifle and its ammunition. As related in the Ordnance Department volume *Planning Munitions for War,*

The principle of the recoilless feature was relatively simple. A perforated cartridge case allowed a portion of the propellent gases to escape to the rear through vents in the breech.

This design enabled powerful and accurate ammunition to be fired with no discernable recoil effect. An Ordnance Department report commenting on the weapon's lack of recoil stated that "Anyone doubting its performance could put a glass of water on the tube and fire without spilling a drop."

Development of the recoilless rifle started in early 1943 when the Ordnance Department's Small Arms Division of the Research and Development Service began studying the recoilless principle. The Frankford Arsenal's laboratory assisted in the analysis of the basic theory, and a great deal of ballistic computations were formulated and evaluated. The first pilot model was ready for testing on July 27, 1943. These tests resulted in modifications and improvements and the first finished prototype was produced in October of 1943. Designated as the "Rifle, Recoilless, 57mm, T15E1," the weapon was thoroughly tested at the Aberdeen Proving Ground November 8-10, 1943.

T15E3 and M18 57mm Recoilless Rifles

The first production version of the 57mm recoilless was designated as the T15E3. This weapon had the trigger and sear connected by rods enclosed in metal housings. Further refinement resulted in a firing mechanism which connected the trigger and sear by wire cables in a conduit and this variant was standardized as the M18. The 57mm recoilless rifle was deemed a high priority weapon and was rushed into production. Most of the weapons produced were M18s, but some T15E3s saw service as well.

The M18 weighed 45 pounds and was just over five feet in length. It could be fired from the shoulder, from an attached monopod/bipod assembly or from the M1917A1 .30 caliber machine gun tripod. The M26 sight was standardized for use with the M18 recoilless rifle.

As there were no suitable manufacturing facilities available at the time, the Ordnance Department contracted with the Canadian firm of the Dominion Engineering Works for production of the 57mm recoilless rifle.

Several types of 57mm projectiles were produced for use with the M18 recoilless rifle. These included a high explosive round (HE) that weighed 5.30 pounds with a range of 4,340 yards and a high explosive, antitank round (HE AT) that weighed 5.64 pounds with a range of 4,300 yards. A smoke round was also produced that weighed 5.66 pounds with the same approximate range as the HE round. Several types of training rounds without inert warheads were also produced. One of the more interesting of these was the sub-caliber firing device, which allowed a .30 caliber carbine cartridge to be fired in the 57mm recoilless rifle for training and familiarization purposes. A .22 rimfire sub-caliber gallery practice round was also produced.

The problems mentioned previously regarding the 2.36" bazooka's lack of power in certain situations prompted the expedited development and delivery of

(top) Soldiers preparing to fire an M18 57mm recoilless rifle mounted on an M1917A1 tripod. (Konrad F. Schreier, Jr.) **(center) A 57mm recoilless rifle being fired on Okinawa, June, 1945.** (U.S. Army) **(bottom) Late WWII photo of American airborne troops firing an M18 57mm recoilless rifle. As can be seen, the lightweight M18 could be fired from the shoulder in much the same manner as the bazooka. Note the folding stock M1A1 carbine on the paratrooper firing the M18.** (Konrad F. Schreier, Jr.)

the M18 recoilless rifle. Ordnance documents report that 50 57mm recoilless rifles along with sufficient ammunition and trained instructors were sent to Europe in March of 1945.

Among the first types of units to receive recoilless rifles were airborne. As stated by General G.M. Barnes,

The recoilless rifle is definitely a step in the right direction for the Infantry. The Airborne Division in particular has been particularly vulnerable to armor. With the addition of the ...recoilless weapons, airborne troops have the means to assist them against tanks and self-propelled guns. In my opinion, the recent operation has proven the practicability of the recoilless rifle and it should be issued to units, with high priority to airborne divisions.

On May 19, 1945, a Tenth Army demonstration team arrived on Okinawa after the initial invasion with two 57mm recoilless rifles and ammunition.

The M18 recoilless rifle was often packed for parachute delivery in the M10 Paracrate, which consisted of an M18 (or T15E3) recoilless rifle and 14 rounds of ammunition. This was often dropped in conjunction with the M12 Paracrate, which contained a M1917A1 tripod and an additional 14 rounds of 57mm recoilless rifle ammunition.

The 57mm recoilless rifle was often fired from the shoulder and employed in much the same manner as the bazooka. While heavier and bulkier than the bazooka, it was significantly more powerful and its range was substantially greater.

T21 and M20 75mm Recoilless Rifles

The successful development of the 57mm recoilless rifle proved the validity of the basic design and work began on a larger and more powerful version. In March of 1944, Ordnance Department engineers began design work on a 75mm recoilless rifle. The first pilot model was completed and tested in September of the same year.

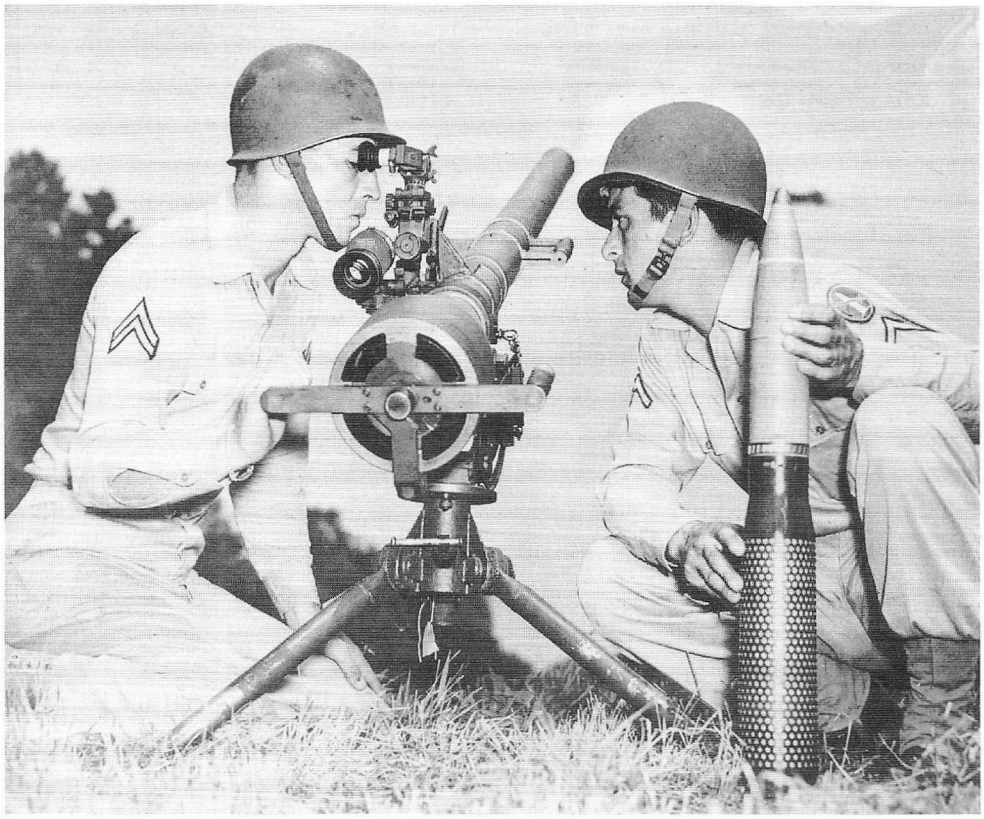
The first version of the 75mm recoilless rifle was designated as the T21. Further testing resulted in a redesigned weapon that featured an improved breech mechanism. The improved variant was standardized as the M20.

The 75mm recoilless rifle was manufactured by the Miller Printing Machinery Company of Pittsburgh, Pennsylvania. The firm began production of the weapon in March of 1945.

The 75mm M20 weighed 114.5 pounds and was 6 feet, 10 inches in length. The weight of the M20 prevented it from being fired from the shoulder as was frequently done with the 57mm recoilless rifle. The M20 was designed to be fired from the M1917A1 .30 caliber machine gun tripod.

As with the 57mm recoilless rifle, the M20 could fire several different types of ammunition. The most

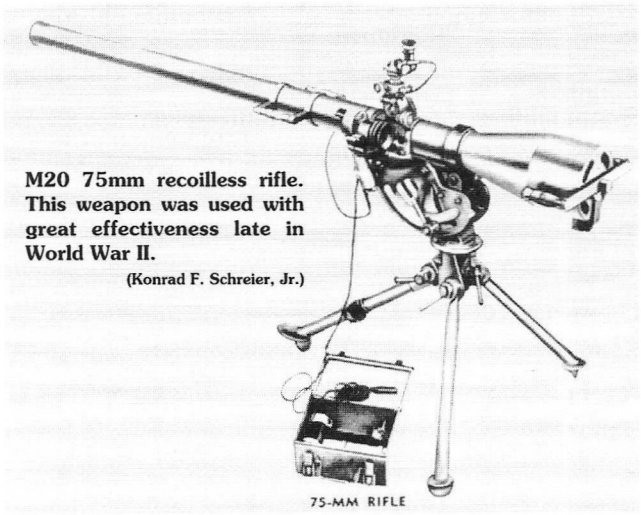
commonly used was the high explosive (HE) round which weighed 21.86 pounds and had a maximum range of approximately 7,000 yards. In addition, a high explosive antitank (HE AT) round, which weighed 20.54 pounds and a range comparable to the HE round, was produced. A smoke shell (T40) filled with white phosphorus was also developed. This round weighed some 22.61 pounds and had a maximum range slightly in excess of the HE round.



Soldier preparing to fire an M20 75mm recoilless rifle. Note the configuration of the shell.
(U.S. Army/Courtesy of Konrad F. Schreier, Jr.)

While the smaller and lighter 57mm performed admirably, it was used essentially in the role of a more powerful version of the bazooka. The 75mm recoilless rifle, on the other hand, represented what could be considered as an entirely new class of weaponry. The M20's accuracy and power were favorably commented on by infantrymen who had the opportunity to use the weapon in the latter stages of World War II. Many Ordnance Department documents from the war are filled with reports extolling the M20's virtues.

An officer in the First Allied Airborne Army in Europe stated the following regarding the 75mm recoilless rifle:



M20 75mm recoilless rifle. This weapon was used with great effectiveness late in World War II.
(Konrad F. Schreier, Jr.)

Its effective range for direct fire is the limit of visibility. The gun is as accurate as an M1 rifle and a tank can be hit in any desired spot.

A lieutenant of a 75mm recoilless rifle crew serving in the 17th Airborne Division near Essen, Germany, in 1945 related that

Whenever any fire was noticed interfering with the Infantry, we dropped 75's into them and the Infantry platoon leader always reported the firing stopped. We were with or ahead of the Infantry all day, during an advance of over three miles, with rifle, mount, and ammunition hand-carried.

Major General William "Bud" Miley, commander of the 17th Airborne Division, related the following outstanding performance of the 75mm recoilless rifle against German armor.

The 507th Parachute Infantry Regiment reports three Mark IV tanks immobilized and knocked out at 400, 450 and 600 yards range. One tank burned, two were hit above the tracks in hull. Total rounds fired at these tanks was 8.

The M20 75mm recoilless rifle's use was not limited to Europe, as it was used with great effectiveness in the Pacific as well where it first saw action on Okinawa. The weapon's employment was described in Ordnance Department documents as "spectacularly

successful." Along with the two 57mm recoilless rifles mentioned previously, the Tenth Army Ordnance demonstration team brought two 75mm recoilless rifles to Okinawa on April 19, 1945. After preliminary training and instruction, more recoilless rifles were delivered to Okinawa and the weapon was used in the closing stages of the bloody battle for the island. However, its use was still quite limited and the Ordnance Department acknowledged that the recoilless rifle did not have "...any real effect on the outcome of the Okinawa campaign."

Nevertheless, whenever it could be brought to bear against the enemy, the weapon proved its worth beyond any question. A platoon leader of the 172nd Infantry who served in the Pacific said,

For ranges under 1500 yards, the 75mm rifle can't be beaten. My crew fired at caves of all sizes and into wooded ravines and scored direct hits in every case.

As aptly summed up in the Ordnance volume *Planning Munitions for War* regarding the recoilless rifles,

Reports from users overseas were enthusiastic. Both in the Pacific and in the European theaters, the 57mm and 75mm recoilless rifles proved highly effective against point targets such as tanks and pillboxes.

A total of 951 57mm and 1,238 75mm recoilless rifles were delivered to the government by the time production stopped in the summer of 1945.

After World War II, the 3.5" bazooka replaced the 2.36" version. The more powerful bazooka also brought about the demise of the 57mm recoilless rifle since it essentially duplicated its function and performance. By the late 1940s or early 1950s, the 57mm recoilless rifle was dropped from use and most were destroyed. The 75mm recoilless rifle was retained as standard and saw wide use in Korea and afterward along with the 3.5" bazooka.

Due to its limited use late in the war, the recoilless rifle is not often thought of as a weapon of World War II. However, when used, it proved to be an excellent weapon and was a triumph for America's infantry weaponry. As stated by General G.M. Barnes,

Ordnance Department's opinion is that their development (of the recoilless rifle) constitutes a great advance in firepower for the foot soldier.

4.5" Rocket Launcher

Before we leave the subject of infantry fire support weapons, brief mention should be made of the M8A2 4.5" rocket and its launcher. Unlike the 2.36" bazooka rocket, which was primarily an antitank weapon, the 4.5" rocket was fired from landing craft and other vehicles to supplement artillery fire.

The Marines employed some of these rockets as ground support weapons by launching them from a simple single trough launcher. Special rocket platoons were organized and equipped with these rockets and launchers and were first employed on Bougainville. The use of these weapons was not widespread or long lasting. When employed in such a manner, the 4.5" rocket was relatively inaccurate and ineffective. These launchers were soon replaced by mortars and other weapons as they became available.

A Marine "Rocket Platoon" advancing towards Torokina, Bougainville, November, 1943. The first two Marines are carrying single M8A2 4.5" rockets and the third Marine is carrying the simple, single trough launcher. First used on Bougainville, the 4.5" ground launched rockets saw very limited use in WWII. (USMC)

Collector Notes

Collector interest in the M18 and M20 recoilless rifles is rather limited today. Not many of these weapons survived after their retirement by the military. A relatively small number have been registered and are available to collectors today. Unlike bazookas and mortars, few demilled recoilless rifles are either on the market or found in collections.

Recoilless rifles (and any live ammunition) would be classed as Destructive Devices with the consequent legal restrictions to ownership. The sub-caliber inserts, which enable the 57mm recoilless rifle to fire .30 carbine or .22 rimfire cartridges, are scarce items today and would be of interest to anyone owning such a weapon. Complete dummy rounds are not especially common and would be interesting additions to a recoilless rifle in a collection.

Despite their limited use, the 57mm and 75mm recoilless rifles of World War II are nevertheless interesting and historically significant weapons. Their role as World War II infantry weapons should not be overlooked.

Flame Throwers

One of the more interesting but little discussed infantry weapons of the Second World War is the flame thrower. While fire has been used as an instrument of war since antiquity ("Greek Fire", etc.), the genesis of the modern portable flame thrower was with the Germans in the first decade of the twentieth century. The Germans first used flame throwers against the French at Malencourt on the Western Front early in World War I. The weapon proved to be terrifying to the French troops, but its impact was limited due to reliability problems. The French and British armies rushed to develop flame throwers of their own to counter the German threat. By 1916, both Allied nations had also fielded flame throwers, but like those of the Germans, they proved to be unreliable, vulnerable and only useful at very short range.

The United States did not employ any flame throwers during the First World War and little research and development was carried out on such weapons after the Armistice. A post-WWI U.S. Ordnance Department report concluded that the American military believed that the flame thrower was "...the least valuable incendiary munition and regarded...its performance as a total failure." One American general stated that the flame thrower was "one of the greatest failures among the many promising devices tried out on a large scale in the war."

The Army's Chemical Warfare Service (CWS) was charged with carrying out the small amount of R&D on flame throwers during the post-WWI period. Due to the weapon's overall unfavorable reputation at the time, the Chief of the CWS quipped that "In the Chemical Warfare Service it has been the habit for a long time not to mention the flame thrower at all, unless questions were asked about it."

Despite the lack of interest by the United States, other nations continued to develop flame throwers during the 1920s and 1930s. Tank mounted flame throwers were used by the Italians during the Abyssinian War (1935-1936), and a few such weapons were also supplied by the Germans for use in the Spanish Civil War in 1937. In the opening days of World War II, the Germans made use of flame throwers in Poland, Belgium and France.

The renewed use of flame throwers as combat weapons was not lost on the American military establishment. On August 12, 1940, the Secretary of War directed the CWS to begin work on the development of a flame thrower for the U.S. military. Much of the development work for the American flame thrower was carried out at the Edgewood (Maryland) Arsenal, which was adjacent to the Aberdeen Proving Ground.

E1 and E1R1 Flame Throwers

The first experimental model developed by the Chemical Warfare Service was designated as the E1. The CWS used "E" and "R" designations to denote experimental items rather than the "T" and "E" designations used by the Ordnance Department. The Kincaid Company of New York produced a few E1 flame throwers for testing in the fall of 1940. The weapon had four basic components; a storage system for the fuel, a storage system for compressed gas to propel the fuel, a flame gun and an ignition system. The fuel supply held five gallons of diesel oil, fuel oil or a blend of gasoline and oil. The gas system contained pressurized nitrogen. Both the fuel system and gas system were contained in a single vertical cylinder that held the fuel in one compartment and the gas in another. A trigger mechanism released the fuel that was propelled by the nitrogen gas and ignited by an electrical spark supplied by a battery. The weapon weighed 70 pounds when completely loaded and had a range from 14 to 21 yards.

Testing revealed that the E1 flame thrower was "..cumbersome, heavy and undependable." Chemical

Warfare Service engineers redesigned the E1 and a contract was given to the Kincaid Company for development of the improved E1R1 flame thrower which was tested at the Edgewood Arsenal in March of 1941. The E1R1 was a definite step forward from the unsatisfactory E1. The new flame thrower had the fuel supply and the nitrogen gas contained in separate tanks, which was a feature found in all subsequent World War II American throwers. The E1R1 also had improved valves and a refined electrical system. It weighed 32 pounds empty and about 57 pounds fully loaded.

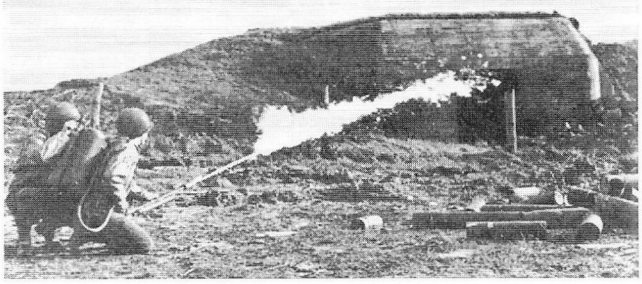
Despite its marked improvement over the E1, the E1R1 was still not a satisfactory weapon. Its range was quite limited, only about 15 to 20 yards, and its time of use was only some 15 to 30 seconds. It was also very uncomfortable to carry and the valves could not be easily reached by the operator. Nevertheless, even with the faults, the E1R1 was the only flame thrower in the American arsenal at the time of our entry into World War II. A Chemical Warfare Service document reflects that only 12 flame thrower were on hand at the time of the Pearl Harbor attack. Production was immediately increased while an improved variant was being developed. The E1R1 was the first American flame thrower to be employed during World War II in the early days of fighting in the Pacific.

The first recorded use of the E1R1 flame thrower was reported by the Chemical Warfare Service as follows:

On 8 December 1942 near Buna Village, Papua, Corp. Wilbur G. Tirrell crawled through the underbrush to a spot some thirty feet from a Japanese emplacement. He stepped into the open and fired his flame thrower. The flaming oil dribbled fifteen feet or so, setting the grass on fire. Again and again Corporal Tirrell tried to reach the bunker, but the flame would not carry. Finally a Japanese bullet glanced off his helmet, knocking him unconscious.

This was hardly an auspicious beginning to the use of flame throwers by the American military.

M1 flame thrower gun and tanks.
(Hayes Otoupalik/Allen Kornblum Collections)



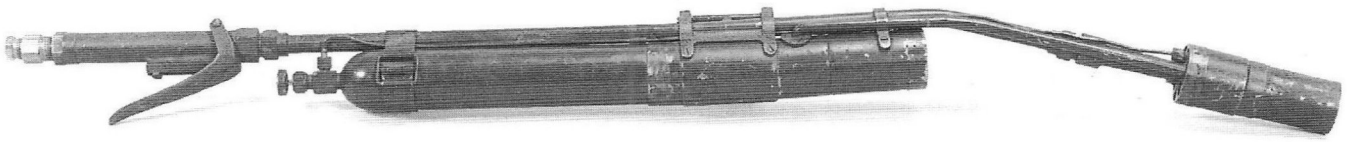
Army combat engineers training with the early E1R1 flame thrower. This was the first type of American flame thrower used in combat during WWII; it proved to be very unreliable.
(U.S. Army)

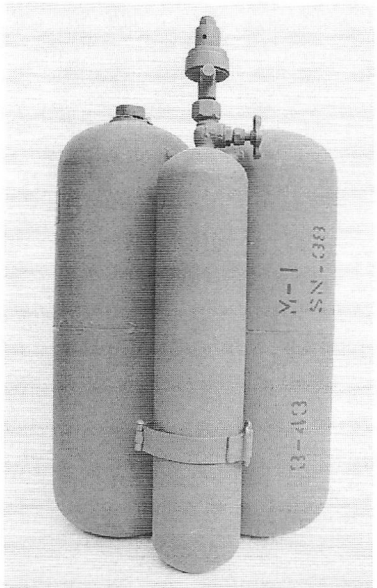
M1 Flame Thrower

The E1R1 clearly needed improvement if the flame thrower was to become an effective weapon. The Chemical Warfare Service hurriedly proceeded with the development of a slightly modified and improved version of the E1R1. The improved E1R1, standardized in August of 1941 as the M1, had a longer range and greater reliability than its predecessor. The firm of E.C. Brown Company of Rochester, New York, a manufacturer of agricultural sprayers and other related equipment, was awarded a contract for manufacture of the M1 flame thrower and production began in March of 1942. By the end of the year, M1 flame throwers were appearing in the South Pacific. The first combat use of the M1 flame thrower was on January 15, 1943, on Guadalcanal.

While the M1 was an improvement over the E1R1, there were still a number of problems encountered with the weapon. As reported in a Chemical Warfare Service document,

A Chemical Warfare Service engineer training with an early model M1 flame thrower. The M1 was soon replaced by the improved M1A1 and, later, the M2-2.





(top) M1 flame thrower gun. Note the operating lever at left. (far left) M1 flame thrower fuel and propellent tanks with attached regulator. (left) Rear view of M1 flame thrower back pack. (below) Data plate for M1 flame thrower manufactured by the E.C. Brown Co. of Rochester, New York.

(Hayes Otoupalik/Allen Kornblum Collections)

One specimen (of the M1 flame thrower) just received from the States, might function properly and spurt a jet of flame the customary fifteen yards, but its twin might eject a harmless stream of nonburning oil a distance of five yards. Batteries in the ignition circuit deteriorated rapidly in the hot, humid climate; inadequate waterproofing allowed moisture to corrode parts and to short-circuit the electrical system; and minute rust holes in tanks allowed compressed gas to escape and the pressure to drop. Chemical maintenance companies had their hands full inspecting, testing, repairing, and servicing flame throwers to keep them in proper working order for the troops.

The unpopularity of the M1 flame thrower was confirmed in an Ordnance Department document:

Despite the knowledge that the enemy had no better weapon, it did not overcome the dislike and distrust the American troops felt for the M1.

M1A1 Flame Thrower

In addition to the reliability problems of the M1 flame thrower, the weapon's limited range of only some 15 yards obviously reduced its effectiveness. The Chemical Warfare Service had developed napalm as a thickening agent added to gasoline for use in incendiary bombs. Experimentation revealed that the use of a napalm-thickened gasoline mixture in a flame thrower greatly increased its range and also its lethality. As stated in a CWS report,

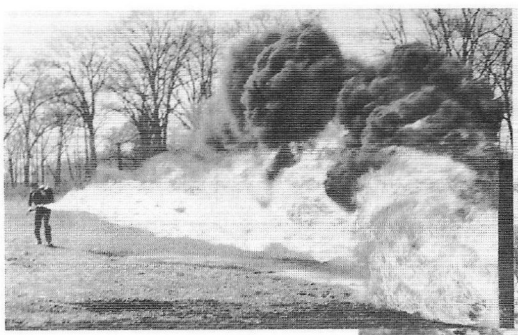
...ordinary gasoline broke into a spray after it left the nozzle of the flame gun and burned itself out in a billow of fire while thickened fuel flew through the air in a compact stream that would ricochet into portholes and stick to flat surfaces.

However, the napalm-gasoline mixture would not function well in the M1 flame thrower. A Chemical Warfare Service report compared the use of the new mixture in the M1 flame thrower to "...running a 1910 model automobile on modern premium fuel." Col. William C. Kabrich, Chief of the CWS Technical Division, appointed a committee to recommend changes in the M1 flame thrower so it would be possible to use with the napalm-gasoline fuel. The committee was instructed to "...make the changes in the M1 as few and as simple as possible."

Most of the changes suggested by the CWS committee consisted of modifications in the M1's fuel system, including the valves and pressure regulator. The flame gun was also modified to permit operation at higher pressures required by the use of napalm. The waterproofing of the flame thrower was also improved. Various napalm-gasoline mixtures were tested to determine which formulation gave the maximum range when used in the modified flame thrower.

The new weapon was standardized in late 1942 as the M1A1. While externally the M1 and M1A1 flame throwers were virtually identical, the latter was a dis-

Early WWII photograph of a U.S. Army soldier carrying an M1 flame thrower or an early M1A1. The M1 and M1A1 flame thrower were externally very similar. (U.S. Army)



(above) U.S. Army troops testing an M1A1 flame thrower. This photo gives some idea as to the amount of flame that could be produced by one of these weapons.
(U.S. Army)

(right) Soldier firing an M1/M1A1 flame thrower at a bunker.
(U.S. Army)

Close-up view of an M2 flame gun. The trigger is located ahead of the front hand grip and operated the pyrotechnic ignition system. The rear hand grip contains the lever that controlled the flow of fuel. (Hayes Otoupalik Collection)

tinct improvement over the former. The M1A1 had almost three times the range of its predecessor. A CWS test report stated that

In aiming (the M1A1 flame thrower) at the port of a pillbox fifty yards away it could place half of the thickened fuel inside the structure. The old model (the M1) could not reach a pillbox fifty yards away, and could place only about 10 percent of its charge in a pillbox twenty yards away.

Although some problems still remained with the reliability of the M1A1 flame thrower's electrical system, the weapon was such an improvement over the M1 that it was immediately ordered into quantity production. A contract for the new M1A1 flame thrower was awarded to the E.C. Brown Company. To further boost production, the Chemical Warfare Service contracted in April of 1942 with the Beattie Manufacturing Company of Little Falls, New Jersey for the production of M1A1 flame throwers. The Beattie Company was an established manufacturer of rugs and carpets and had hired an engineer who previously worked with the CWS in the development of the early model flame throwers. Between them, the two firms produced approximately 14,000 M1A1 flame throwers.

The M1A1 flame throwers began to arrive in the combat zones in mid-1943. The weapons reached the Mediterranean theater in June, the South Pacific in July and the Southwest Pacific in August. The initial reports were generally favorable, but some problems were encountered with the electrical ignition system. Chemical Warfare Service documents relate several examples of such failures with the M1A1 flame thrower. One example occurred on Leyte on October 20, 1944, when a soldier fired a M1A1 flame thrower at a Japanese pillbox. When the electrical system failed to ignite the fuel, a nearby soldier (Pfc. Frank B. Robinson of the 19th Infantry) threw a handful of burning paper in front of the pillbox and the stream of fuel was ignited. A similar incident occurred on June 9, 1944, near Azeville, France, when Pvt. Ralph G. Riley fired his M1A1 flame thrower at a German bunker. When the ignition system failed, Riley held a burning match near the nozzle and ignited the fuel. The subsequent flame ignited ammunition in the bunker and 169 Germans surrendered. The feat earned Riley a Silver Star.

As correctly summed up in a Chemical Warfare Service report, "..the flame thrower's record was not one of uninterrupted success. Often the inherent weaknesses of the M1's and M1A1's were a source of considerable trouble to the troops who used them."

M2-2 Flame Thrower

With this in mind, the Chemical Warfare Service continued its efforts to develop an improved flame thrower that would either eliminate or reduce the problems found in the M1A1 version. A committee considered two types of improved flame throwers for testing. The E2 was developed by the Standard Oil Company and featured a waterproof electrical ignition system with a long-life battery and lightweight aluminum fuel tanks. The second weapon tested was developed by the Chemical Warfare Service and designated as the E3. This variant had a streamlined flame

Data plate on M2 flame gun as manufactured by the R.F. Sedgley Company. (Hayes Otoupalik Collection)

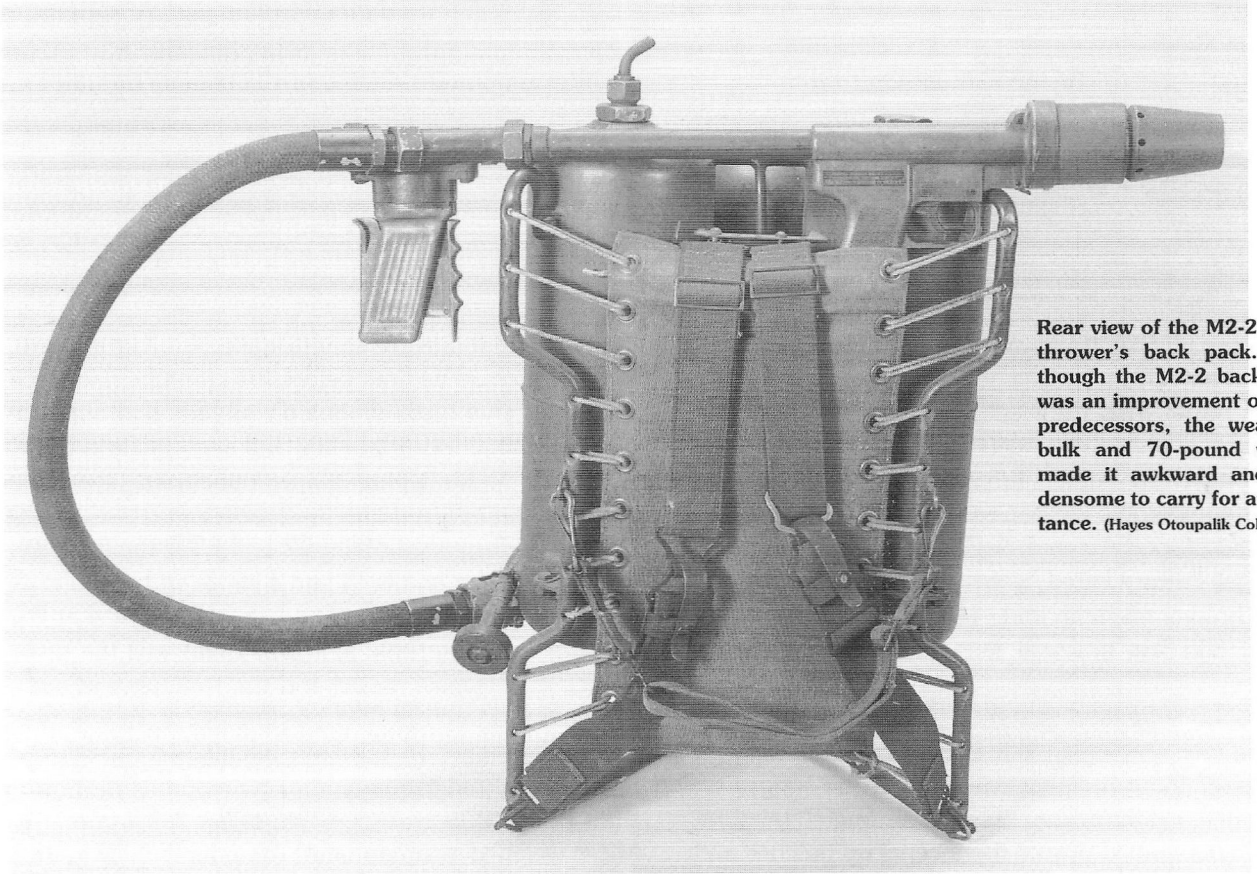
Two Marine M2-2 flame thrower operators during World War II. Combat experience revealed that flame throwers were generally more effective operating in pairs. (National Archives)

gun, more reliable valves, a better fitting backpack carrying system and a pyrotechnic cartridge type ignition system rather than the electrical type ignition system used on the previous models. Japanese flame throwers captured on Bataan in early 1942 had a similar type of pyrotechnic ignition system, which was studied at the Edgewood Arsenal. A CWS officer stated at the time that "..the United States principle and basis of flame thrower research and development is somewhat inferior and less practical than the Japanese principle."

The E3's ignition system consisted of a plastic cylinder arranged much like a revolver which held six patches of incendiary material. When the trigger on the front hand grip was pressed, a "match-mixture-coated" pin ignited one of the incendiary patches and the resulting shower of sparks ignited the fuel mixture. Six bursts could be fired before the cartridge had to be replaced. This type of ignition system had superior waterproofing characteristics and was more reliable, especially under typical jungle conditions, than the electrical ignition systems.

The performance of the E2 and E3 flame throwers was very similar and both had a range with napalm of approximately 60 yards. The U.S. Army felt that the E3 with its pyrotechnic ignition system was the more rugged and reliable model and the weapon was standardized in March of 1944 as the M2-2. In this new multiple designation the "M" referred to Model, the first "2" referred to the type of gas and fuel tanks and the second "2" was designation of the flame gun. The M2-2 weighed approximately 70 pounds fully loaded

Complete M2-2 flame thrower. This weapon was widely issued late in World War II and was considered the best operational flame thrower of the war. (Hayes Otoupalik Collection)



Rear view of the M2-2 flame thrower's back pack. Even though the M2-2 back pack was an improvement over its predecessors, the weapon's bulk and 70-pound weight made it awkward and burdensome to carry for any distance. (Hayes Otoupalik Collection)

and had a fuel capacity of four gallons.

The Beattie Company and the E.C. Brown Company were both given contracts to produce the new M2-2 flame thrower. In May of 1944, a third manufacturer, R.F. Sedgley, Inc. of Philadelphia, Pennsylvania, a noted maker of sporting arms, was also given a contract to produce M2-2 flame throwers. Over 24,500 M2-2 flame throwers were manufactured by the three firms during 1944 and 1945. Production of the new M2-2 flame thrower was given a high priority status and was described in government documents as "a new and superior weapon."

The M2-2 flame thrower first appeared in combat during the Guam campaign in July of 1944 and was widely used in all subsequent Pacific battles. While the M2-2 was a definite improvement over previous flame throwers, it was not without some drawbacks. It was criticized as being too heavy when fully loaded, rather uncomfortable when carried for long distances and the fuel capacity was too limited. However, despite these complaints, the Chemical Warfare Service stated that the M2-2 was "...the most reliable flame thrower designed by any army up to that time." The M2-2 was the last of the American flame throwers of World War II to be issued and saw service through the end of the war.

While the flame thrower eventually proved to be a widely used and valuable weapon, there was a great deal of uncertainty regarding its usefulness in the early stages of World War II. The failure of the E1R1 flame thrower during its first combat use in December of 1942 on Buna was cause for much concern. In January of 1943, a senior Chemical Warfare Service officer reported that "..the way the flame throwers let the infantry down at a critical point brought them into such ill-repute that I am afraid that they may never want to use them again." This was echoed by the chief of the CWS Field Requirements Branch, who stated that ".. a weapon such as the flame thrower with its temperamental nature has no place in modern warfare where ruggedness and reliability are essential." Such

A World War II Marine Corps flame thrower team in the Pacific. Note the two Marines armed with M1 rifles and the BARman providing covering fire for the flame thrower operator.

(National Archives)

high-level discouragement and pessimism certainly would not have appeared to bode well for continued development and issue of flame throwers. However, as stated in a Chemical Warfare Technical Services report on the subject, "...if the flame thrower was too temperamental to rely on, it was potentially too useful to abandon."

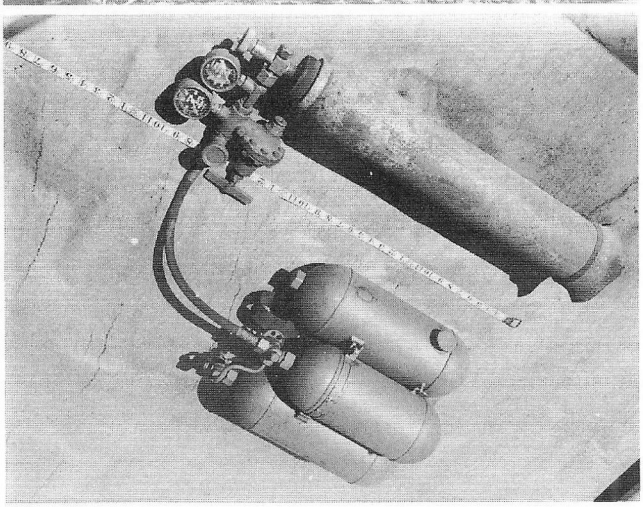
The problems being encountered with the early flame throwers could be traced to three major areas.

(1) Faulty design

(2) Poor maintenance

(3) Lack of training and tactical application.

The first problem, that of faulty design, was addressed by the development of the improved M1A1 and M2-2 flame throwers and their ability to be used with the much more effective napalm fuel. As stated, although reliability problems were never entirely eliminated, the later variants of the flame thrower were infinitely more reliable and effective than the early versions that had caused so many problems in the first years of the war.



(top) 93rd Chemical Composite Company testing various flame thrower fuel compounds, Milne Bay, New Georgia. (U.S. Army) **(bottom) Charging apparatus and regulator for flame thrower compressed gas tanks.** (U.S. Army)

The problem of poor maintenance plagued the flame thrower, particularly in the early stages when the less reliable models were in use. The climate of the Pacific theater played havoc with the flame throwers. A CWS report stated that "..most malfunctions resulted from deteriorated cylinders and batteries which had succumbed to the deleterious temperatures and humidity of the tropics." A program to overhaul all of the flame throwers in the Southwest Pacific was instituted in 1943.

Some problems were also found with newly manufactured flame throwers that were received by the troops overseas and found to be "..unusable because of missing or defective parts or because of improper packing or waterproofing. Upon arrival from the United States, these weapons had to be turned over to chemical units for inspection, servicing, and rewaterproofing."

Keeping flame throwers in peak operating condition proved to be a labor-intensive task and the CWS service organized flame thrower schools to train maintenance supervising officers. The Chemical Warfare Service reported that "All flame throwers shipped to the Southwest Pacific or carried as equipment by units arriving in the area were thoroughly tested, repaired, and waterproofed by trained technicians." Spare parts and accessories were frequently in short supply for much of the war. The practice of rigorously maintaining flame throwers greatly increased the weapons' capability and did much to overcome their initial poor performance record.

The final obstacle to overcome in the effective utilization of flame throwers was that of proper troop training and employment in combat. When flame throwers were first fielded during World War II, their use by both the Army and Marine Corps was restricted to combat engineers. This is confirmed in a Chemical Warfare Service report, which stated that

Since the flame thrower was a comparatively new weapon, and until 1943 one largely assigned to the engineers, few of the troops..had been trained to use it.

The fact that infantrymen were not authorized to use flame throwers obviously restricted the utilization of the weapons in many instances. As more reliable flame throwers and better maintenance procedures resulted in a greater use of flame throwers, the shortage of engineers frequently hampered effective use of the weapons. This is aptly summed up by a CWS officer who stated that

Experience showed that the engineers were too busy with other jobs to handle the flame thrower; that the weapon would be better utilized in the

hands of the infantry.

In order to train infantrymen to operate flame throwers and provide instruction to others, the Chemical Warfare Service expanded the flame thrower schools. A memorandum dated October of 1943 ordered that the CWS "...extend flame thrower training to the infantry." The flame thrower schools stressed tactics as well as operation and maintenance. As a government document reported, "...Improving the flame thrower and training operators to employ it occupied most of 1943...achievements in both fields were substantial..."

Putting flame throwers into the hands of trained infantrymen did a great deal toward increasing the usefulness of the weapon and contributed immeasurably toward its eventual success as an infantry weapon. One amusing anecdote regarding the flame thrower is related in the book *Semper Fi, Mac,* in which the legendary Marine Lewis "Chesty" Puller commented upon first seeing a flame thrower, "Where the hell do you put the bayonet?"

Since the flame thrower was, for all intents and purposes, a new weapon to the American military of World War II, effective tactics had to be devised to take proper advantage of the weapon. It was immediately obvious that a soldier carrying seventy pounds of flammable fuel and pressurized gas was quite vulnerable to enemy fire. Flame thrower operators were prime targets for the Japanese. This is confirmed in the book, *Semper Fi Mac,* in which a Marine officer recalled, "..above all they (the Japanese) hated the special equipment men, especially the flame throwers. My God how they hated those men!"

In order to protect the flame thrower operator, it was necessary to provide covering fire to keep the enemy down until the operator could get close enough to perform his duties. As correctly stated in an Ordnance document,

Units discovered that the flame thrower, because of its limited range and short duration of fire, had to be used in conjunction with other weapons in order to be effective. A trained security detachment armed with rifles, automatic rifles, and smoke grenades was needed to keep the enemy under cover long enough for the flame thrower operator to approach and flame his target.

The proper flame thrower tactics were evolved by trial and error. An Ordnance Department report revealed that early in the war

Commanders and operators had little understanding of the proper tactical employment of the weapon (flame thrower). Adequate infantry support was not always provided; in some cases not a single rifleman was assigned as protection.

The same report went on to conclude that "..obvious was the need for co-ordinated flame thrower teams composed of operators and riflemen."

Various types of flame thrower teams were organized to determine the most effective ways to utilize flame throwers. Early in the Pacific campaigns, the Army organized two man flame thrower teams consisting of an operator and assistant operator. Three such teams were assigned to an 18-man assault party, which included bazookas and demolition charges supported by rifles and automatic rifles.

The Marines organized similar tactical units for their flame throwers. One early unit was the flame thrower group, consisting of five men, two assigned to each flame thrower and a group leader. It was soon discovered that the weapons were usually more effective when employed in pairs. Machine gun or mortar carts were often utilized to carry extra fuel and gas cylinders when terrain permitted. Other group members were armed with BARs and M1 rifles to provide covering fire for the flame throwers. Eventually, the Marines organized a special assault squad armed with a bazooka, demolition charges and two flame throwers.

As the war progressed and flame throwers became both more reliable and more commonly seen, they were considered as a standard infantry weapon and generally used in conjunction with conventional weapons. While many types of small unit organizations and tactics were formulated to take advantage of the flame thrower, a cardinal rule was always to provide adequate covering fire. Flame thrower duty was not a "plum" assignment, and many troops, understandably, were not always anxious to serve as flame thrower operators. An interesting 1953 Special Report conducted by the Chemical Corps Medical Laboratories entitled "The Psychological Aspects of Flame," gives the results of psychological testing conducted on some flame thrower operators at the conclusion of World War II. The report stated that

...(studies) emphasize the psychological handicap which the operator of a flame thrower has. Pressure and fuel tanks, strapped to the back of a soldier...make for a rather uneasy state. Hence, the soldiers involved must be convinced of the effectiveness and dependability of the weapons.

The problems encountered with the early versions of the flame thrower certainly contributed to its initial unfavorable reputation. Although the later models of flame throwers were greatly improved, some negative feelings about the weapon lingered on to some extent for the entire war.

U.S. Marine firing an M2-2 flame thrower into a Japanese cave on Okinawa. Note the rifleman at the right providing covering fire.
(U.S. Marine Corps/Konrad F. Schreier, Jr.)

Despite its unfavorable beginning, the flame thrower played a key role in the war, particularly in the Pacific. Ever-increasing numbers of flame throwers were employed in the battle against the Japanese. A vivid example of this was the fact that the number of flame throwers authorized for a Marine division increased from 24 in 1943 to 243 in 1944! After 1943, a Marine infantry battalion typically had one flame thrower assigned to each of its nine rifle platoons, nine to the battalion supply section and another nine to the regimental service platoon. This ratio was calculated to enable the rapid replacement of damaged flame throwers, which was a wise policy given the weapon's vulnerability during combat and its propensity to malfunction if not properly maintained.

Some light and medium tanks were equipped with large capacity flame throwers as well. While outside the scope of this book, such flame tanks were useful in certain applications but could not always be employed due to the rough terrain on many of the Pacific islands. Nevertheless, the flame throwing tanks were awesome weapons when they could be used and supplemented the infantry's portable flame throwers.

While the Marine Corps and the Army employed flame throwers with increasing frequency from Guadalcanal until the end of the war in the Pacific, the weapon's use in the Mediterranean and European theaters was an entirely different story. When the U.S. Army invaded North Africa, each division's combat engineer battalion had 24 flame throwers. These were the E1R1 and M1 variants that could not be used with the improved napalm fuel. The flame throwers were not used in the campaign for several reasons. The rapidly moving tactics employed, the lack of suitable targets such as pillboxes and bunkers, and the lack of cover for the operator made the use of flame throwers

M4 Sherman tank fitted with a flame thrower. When terrain permitted, such mechanized flame throwers were very effective and valuable weapons. (U.S. Army)

virtually nonexistent. Also, improper training and maintenance procedures would have resulted in unsatisfactory performance if they were used to any appreciable degree.

The M1A1 flame thrower made its appearance in the theater just prior to the invasion of Sicily. Some demonstrations of the improved flame thrower were conducted during the assault preparations, but the troops were not convinced that the weapons would be of much use during the campaign. It is recorded in Ordnance documents that "The engineer battalions of two divisions returned their flame throwers to the base depot before embarking for Sicily."

Although a few flame throwers did make it to Sicily, there was only one recorded use of the weapon in the campaign. This occurred when combat engineers of the First Division used flame throwers to burn a wheat field hiding enemy soldiers.

Little appreciation was evident for the flame thrower during the training for the invasion of Italy. Some units did not even bother to exchange their M1 flame throwers for the new M1A1s. However, some of the engineer battalions did carry their allotment of flame throwers when they embarked for Salerno. Flame throwers saw little use in Italy, although several incidents are recorded in which the weapons proved to be of value. The fixed fortifications encountered in the Gustav Line were found to be troublesome, and the flame throwers could be of value in such instances. One example is reported in the CWS volume *Chemicals in Combat.*

In May 1944 a platoon of Company G, 339th Infantry, had been held up for two days near Tremensuoli by a series of enemy pillboxes which stretched across a dominant ridge two hundred yards away. Finally, Lt. Robert T. Waugh, the pla-

toon leader, secured a portable flame thrower from regimental headquarters. Under the covering fire of small arms and automatic weapons, Sgt. Fred Juliano, an assistant squad leader, crawled with the flame thrower to within fifteen yards of the key pillbox. Three short bursts killed all of its defenders..

However, the use of flame throwers in Italy was limited because of the rugged terrain and often unfavorable weather conditions. Waterproofing and maintenance procedures in the Mediterranean and European theaters never reached the levels attained in the Pacific, and this often hampered the effectiveness of the few flame throwers used.

The Army organized flame thrower schools in anticipation of the Normandy invasion. For this operation, the allocation of flame throwers for the First Infantry Division was greatly increased from 24 to 150 which compounded the problem of training sufficient numbers of operators. Even with the increased number of flame throwers, there is no indication that any were used during the landings on Normandy. Many of the weapons were either lost coming ashore or abandoned while attempting to get off the beaches. CWS records indicate that "The 14th Chemical Maintenance Company, which landed in Normandy at the end of June, repaired and returned to depot stock over 100 portable flame throwers which it had picked up from salvage piles on the beaches."

The rapid moving breakout from Normandy provided little opportunity to use flame throwers, although fair numbers are reported to have been used in fighting on the Brittany peninsula around Brest. Likewise, some flame throwers were used against emplacements of the Siegfried Line in late 1944 and early 1945. However, the flame thrower was much more a weapon of the Pacific than of the Mediterranean and European theaters. As accurately summed up by one Ordnance Department analysis, "Commanders and troops in Europe never had the same confidence in the portable flame thrower exhibited by their Pacific counterparts." Several reasons existed for the entirely different employment of the flame thrower in Europe and the Pacific. The following illustrative passage in the CWS volume *Chemicals in Combat* speaks to this issue.

Portable flame throwers contributed as little to the success of the operations in the European theaters as they had in the Mediterranean. The weapon was infrequently used and not always successfully. Some infantry divisions never used the flame thrower; few considered it valuable. Reasons for this situation, which was in decided contrast to the successful role played by the portable flame thrower in the Pacific campaigns, are not difficult to find. Foremost was the fact that the fighting in Europe never developed the need for the portable flame thrower, particularly when compared with operations in the Pacific. The latter theaters saw a fanatical enemy determined to resist to the last in defensive positions which were almost impregnable to the normal complement of infantry weapons, even to artillery fire and air action. Moreover, the jungle terrain in which much of the Pacific fighting took place permitted the flame thrower operator to advance to within effective range if he was protected by adequate supporting weapons. This situation was different on European battlefields. As German defenses featured interlocking bands of fire and long, uninterrupted fields of vision, the utilization of weapons with limited range was difficult. The absence of concealment along the approaches drew attention to the size of the portable flame thrower and particularly to the unique silhouette of an operator with his weapon strapped to his back.

In addition to the different types of terrain and fortifications encountered in Europe and the Pacific, the nature of the enemy was also a factor in the greater success of the flame thrower in the latter theater. The fanaticism of the Japanese during many of the island battles of the Pacific is well known. The following comparison contained in a 30th Infantry Division report dated 30 October, 1944, illustrates the difference between German and Japanese soldiers in this regard:

The makeup of the German soldier, as contrasted with that of his Axis ally in the Pacific, had an effect upon flame thrower operations. The Japanese infantryman often fought until death, and flame weapons were needed to insure that he was dead. The German soldier, on the other hand, skilled and valorous as he was, surrendered when conditions provided no alternative.

The often suicidal refusal of the Japanese to surrender when a battle was hopelessly lost and the cleverly constructed bunkers and cave complexes found on many of the islands made the use of flame throwers in the Pacific a necessity. As correctly stated in the book *There's a War To Be Won,* "Just as the Americans learned how to attack more effectively, though, the Japanese seemed to get better at constructing defenses to frustrate them. The only way to take the island(s) was by close combat; by closing with the enemy, then burning him out and blasting him out. This was a battle fought with flame weapons and demolition charges..."

General Simon Bolivar Buckner referred to such tactics as the "corkscrew and blowtorch" method; that is, blasting the Japanese with explosive charges and bazookas and then burning out the stubborn survivors with flame throwers.

Some senior American officers felt that the Japanese as a race were more susceptible to flame throwers than troops of other nations. General Robert Eichelberger's senior chemical officer, Colonel Harold Riegelman, is quoted as saying that he "...was convinced that the dread of fire instilled since childhood in the Japanese, because of their wood and paper houses, made flame throwers ideal for the war in the Pacific..." This is echoed in the Chemical Corps Medical Laboratories Special Report "The Psychological Aspects of Flame" in which it was concluded that "...the Japanese troops feared the flame thrower intensely because of his inborn fear of fire." The report later recommended that "...the use of vari-colored flames (napalm and flame thrower) should be explored immediately. Orientals are peculiarly responsive to color..."

Whether or not the Japanese had any more innate fear of the flame thrower than troops of any other nation, the weapon was used against them with great effectiveness, particularly in the latter stages of the war.

Numerous studies were done during and after World War II to ascertain the effectiveness of flame throwers. Research determined casualties were produced not only by the obvious direct flame but also against the inhabitants of bunkers, pillboxes and other such fortifications that were not reached by the flame. A Chemical Warfare Service report stated that "..three important changes occurred within the moment of a flame attack, aside from the penetration of the flaming fuel itself: there was a sudden jump in temperature, lethal concentrations of carbon monoxide were built up in the bunker, and there was a dangerous lowering of oxygen content...Any one of these factors or any combination of them, therefore, meant certain death, quite aside from the effects of direct contact with the flame." The report went on to conclude that "...no positive defense could be devised against flame attack."

A total of 41,452 flame throwers were procured from January 1, 1942, through December 31, 1945. The majority of these were the later M2-2 variant. Development of improved flame throwers continued after the war and later models saw some action in Korea and Vietnam.

Despite its rocky start and its limited use in Europe, the flame thrower proved to be an ace weapon of the war in the Pacific. A historian of the Pacific campaigns has stated that "Perhaps the most valuable weapon on Tarawa proved to be the flame thrower." This same sentiment was acknowledged by many of the Marines and soldiers who fought on Saipan, Iwo Jima and Okinawa. The use of flame throwers during the war is succinctly summed up in the closing paragraph of the Chemical Warfare Service volume on the flame thrower in combat

Flame throwers were not major weapons in the same sense as cannon, rifles, and bombs. Rather they were weapons that proved valuable in certain tactical situations.

To the brave infantrymen who had to root the determined and fanatical Japanese out of their caves and bunkers on numerous Pacific islands during World War II, this is probably a bit of an understatement.

Collector Notes

Collector interest in flame throwers has been rather limited. The major reason is due to the fact that very few flame throwers have survived and are available on the collector's market today. Virtually all of the flame throwers that were declared as surplus property after the war were disposed of for scrap. Before being sold, the flame throwers were demilled to render them unusable. Typically, this process consisted of punching several holes into the fuel and gas tanks and destroying the flame guns by a cutting torch or some other method.

Demilled flame thrower tanks that have been salvaged from scrap piles are sometimes encountered, but uncut flame guns are extremely scarce. Occasionally, virtually undamaged tanks and hoses can be found, but invariably the flame gun is missing. Complete flame throwers of any type are very uncommon and most of the surviving units are the later M2-2 variant.

Interestingly, unlike many of the other weapons such as machine guns, bazookas and mortars, there are no Federal regulations regarding the ownership and registration of flame throwers. The weapons are not considered Destructive Devices and no restrictions are imposed on the Federal level. It is possible that some states and municipalities may restrict or prohibit flame throwers, so a collector who has an opportunity to acquire one should be certain that no laws are being violated.

Extremely few collections contain one or more types of flame throwers. Any of the variants would be an outstanding addition to a World War II collection and would undoubtedly make an interesting and eye-catching display. Flame throwers are invariably overlooked when the infantry weapons of the Second World War are discussed. It is time that this oversight is rectified.

Appendical Tables

The tables that follow will give general information on each of the infantry weapons previously discussed. The "TO&E" referred to is the "Table of Organization and Equipment." This was essentially a guide to a unit's basic arms and associated equipment. The TO&Es give the authorized number of the various weapons in Army and Marine units. The actual number of the various weapons employed in these units could be, and very often were, varied by "special orders."

Several types of Army and Marine Divisions are referenced in the tables that follow. As a point of explanation, the U.S. Army had two types of divisional organizations at the beginning of WWII. The "Square" Division had two infantry brigades of two regiments and one artillery brigade of three regiments (total of 21,000 officers and men). The "Triangular" Division was organized on the basis of three regiments of infantry, each supported by one battalion of artillery (total of 16,024 officers and men). The Marine Corps designated their divisions as "D" Series (1942), "E" Series (1943), "F" Series (1944) and "G" Series (1945).

Table #1
M1905 Bayonet

Overall Length:	20.5"
Blade Length:	16"
Production Dates:	Produced prior to World War II from 1905 to 1920s. Manufactured during WWII from April, 1942 through May, 1943.
Production Total:	1,540,578 M1905 bayonets manufactured during WWII. Several hundred thousand SA and RIA bayonets made prior to WWII. 1,007,671 M1905 bayonets altered to "M1" specifications from September, 1943 to August, 1945.
Manufacturers:	(Pre-WWII) Springfield Armory and Rock Island Arsenal. (WWII) UFH, WT, AFH, UC, OL, Pal.
Classification:	"Standard" from 1905 until February, 1943 when changed to "Limited Standard." Declared "Obsolete" July, 1945.
Issuance:	M1903, M1903A1, M1903 (Modified), M1903A3, M1903A4 and M1 rifles.

Note: Rebuilt and WWII production M1905 bayonets had parkerized blades and plastic grips.

Table #2
M1917 Bayonet

Overall Length:	21.8125"
Blade Length:	17"
Production Dates:	1917 - 1919 (None made during WWII)
Production Total:	In excess of 2.5 million.
Manufacturers:	Remington and Winchester.
Classification:	"Limited Standard" during WWII for use with M1917 rifles and riot shotguns fitted with bayonet attachments. Declared "Obsolete" in 1945 for M1917 rifles but remained "Limited Standard" for shotguns.
Issuance:	M1917 rifles and the following shotguns with bayonet attachments: Winchester M97 & M12, Ithaca M37 and Stevens M520-30 and 620A.

Note: Many M1917 bayonets were refurbished for use in World War II.

Table #3
M1 Bayonet

Overall Length:	14.4375"
Blade Length:	10"
Production Dates:	April, 1943 - August, 1945.
Production Total:	2,948,648. 1,007,671 more produced from conversion of M1905 bayonets.
Manufacturers:	Pal, AFH, UC, OL.
Classification:	"Standard" as of February 11, 1943.
Issuance:	M1903, M1903A1, M1903 (Modified), M1903A3, M1903A4 and M1 rifles.

Note: The converted bayonets were made from either pre-1920s vintage Springfield or Rock Island M1905 bayonets or from WWII production M1905 bayonets.

Table #4
M1941 Johnson Rifle Bayonet

Overall Length:	12"

Blade Length:	8"
Production Dates:	Late 1941 - Early 1943
Production Total:	Approximately 70,000
Manufacturer:	Cranston Arms
Classification:	Not officially standardized
Issuance:	M1941 Johnson Rifle

Note: Even though approximately 70,000 M1941 Johnson rifles and bayonets were manufactured, only a few thousand were procured by the U.S. Marine Corps and OSS during World War II.

Table #5
M4 Bayonet-Knife

Overall Length:	11.75"
Blade Length:	6.75"
Production Dates:	July, 1944 - August, 1945
Production Total:	2,260,519
Manufacturers:	Imperial, Case, ACC, Camillus, Utica, Aerial, KI, Pal.
Classification:	"Standard," April, 1944.
Issuance:	Carbines equipped with T4 front band with bayonet lug. Also supplemented and, eventually, replaced the M3 trench knife.

Note: The M4 Bayonet-Knife was based on the M3 trench knife.

Table #6
M1918 Mark I Trench Knife

Overall Length:	11.5"
Blade Length:	6.75"
Production Dates:	1918 - 1919 (None made during WWII)
Production Total:	Approximately 139,000
Manufacturers:	Landers, Frary & Clark (LF&C) and "Au Lion" (French-made). (HD&S and OCL produced knives in very limited prototype quantities).
Classification:	"Limited Standard" in 1927 and "Obsolete" in January of 1945.
Issuance:	Primarily issued to specialized troops such as airborne and Army Rangers during WWII.

Note: The M1918 Mark I saw little, if any, use in the First World War but was the major combat knife available at the beginning of WWII.

Table #7
M3 Trench Knife

Overall Length:	11.5"
Blade Length:	6.5625"
Production Dates:	March, 1943 - August, 1945
Production Total:	2,590,247
Manufacturers:	Imperial, Aerial, Case, Camillus, Boker, Kinfolks, Robeson, Utica, Pal.
Classification:	"Standard" on January 14, 1943.
Issuance:	Originally authorized for issue to troops armed with M1 carbines and for airborne and Ranger units.

Note: Even though the M3 was superseded by the M4 Bayonet-Knife, it remained in wide use through the end of WWII.

Table #8
V-42 Stiletto

Overall Length:	12.5625"
Blade Length:	7.3125"
Production Dates:	January, 1943 - November, 1943
Production Total:	3,420
Manufacturer:	W.R. Case & Sons Cutlery Company
Issuance:	Produced for issue to the U.S. Army's First Special Service Force.

Note: The V-42 is one of the rarest and most valuable of the WWII military knives.

Table #9
U.S. Navy Mark 2 ("KaBar")

Overall Length:	12"
Blade Length:	7"
Production Dates:	1942 - 1945
Production Total:	one million +
Manufacturers:	KaBar, Camillus, Pal, RCC, Robeson.
Classification:	"Standard" on January 27, 1942.
Issuance:	Widely issued to Navy and Marine Corps personnel with some limited issuance to Army personnel as well.

Note: Post-war production versions of the Mark 2 are still in U.S. service today.

Table #10
USMC Stiletto

Overall Length:	12.5"
Blade Length:	7.25"
Production Dates:	1942 - 1943
Production Total:	14,370
Manufacturer:	Camillus Cutlery Company
Issuance:	U.S. Marine Raider units

Note: Many Raider stilettos will evidence deterioration of the guard and/or hilt.

Table #11
V-44 "Gung Ho" Knife

Overall Length:	14"
Blade Length:	9.375"
Production Dates:	1934 - 1942
Manufacturers:	Collins, Case, Kinfolks, Western.
Issuance:	Originally developed as a jungle survival weapon in the early to mid-1930s. 1,000 V-44s adopted by the USMC's 2nd Raider Battalion. Eventually acquired by several Marine units during WWII.

Note: The original 2nd Battalion knives had green horn handles and were serially numbered.

Table #12
M1917 Smith & Wesson Revolver

Operation:	Double Action Revolver
Caliber:	.45 ACP

Capacity:	6 rounds
Weight:	2.25 pounds
Overall Length:	10.8"
Barrel Length:	5.5"
Muzzle Velocity:	830 f.p.s.
Dates of Production:	April, 1917 - December, 1918. (None made during WWII).
Total Production:	153,311
Classification:	"Substitute Standard" from 1941 to 1945.
Issuance:	Issued during WWII primarily to Military Police and related units but a number were issued to combat troops, particularly mortar and artillery crewmen.

Note: Original finish was blue. Many were subsequently parkerized when refurbished for use in WWII.

Table #13
COLT M1917 REVOLVER

Operation:	Double Action Revolver
Caliber:	.45 ACP
Capacity:	6 rounds
Weight:	2.5 pounds
Overall Length:	10.8"
Barrel Length:	5.5"
Muzzle Velocity:	830 f.p.s.
Dates of Production:	April, 1917 - December, 1919
Total Production:	151,700
Classification:	Same as S&W M1917
Issuance:	Same as S&W M1917

Table #14
SMITH & WESSON "VICTORY" MODEL REVOLVER

Operation:	Double Action Revolver
Caliber:	.38 Special
Capacity:	6 rounds
Weight:	1 pound, 1 oz.
Overall Length:	9.125"
Barrel Length:	4"
Muzzle Velocity:	870 f.p.s.
Dates of Production:	Late 1941 - Early 1945
Total Production:	256,640
Classification:	"Substitute Standard"
Issuance:	Primarily to Navy and Marine aviators

Note: Military version of S&W's "Military & Police Revolver"

Table #15
COLT COMMANDO REVOLVER

Operation:	Double Action Revolver
Caliber:	.38 Special
Capacity:	6 rounds
Weight:	1 pound, 5 oz. (2" barrel) 1 pound, 6 oz. (4" barrel)
Overall Length:	6.75" (2" barrel) 8.75" (4" barrel)
Barrel Length:	2" and 4" versions
Muzzle Velocity:	870 f.p.s.
Dates of Production:	Early 1942 - Early 1945
Total Production:	Approximately 45,000
Classification:	"Substitute Standard"
Issuance:	Primarily to security and guard personnel

Note: Military Version of Colt "Official Police" model

Table #16
COLT POCKET MODEL PISTOLS

Operation:	Semiautomatic
Caliber:	.32 ACP and .380 ACP
Capacity:	8 round magazine (.32) 7 round magazine (.380)
Weight:	1 pound, 8 oz.
Overall Length:	6.75"
Barrel Length:	3.75"
Muzzle Velocity:	(.32) 980 f.p.s. (.380) 970 f.p.s.
Dates of Production:	1942 -1945
Total Production:	(.32) Approximately 17,000 (.380) Approximately 3,700
Issuance:	Issued to U.S. Army general officers, specified Navy officers, Army and Naval Intelligence and OSS personnel.

Table #17
M1911 AND M1911A1 PISTOLS

Operation:	Semiautomatic
Caliber:	.45 ACP
Feeding Mechanism & Capacity:	7 round detachable box magazine
Weight:	2.43 pounds
Overall Length:	8.62"
Barrel Length:	5"
Muzzle Velocity:	830 f.p.s.
Dates of Production:	(M1911) 1911 - 1926 (M1911A1) 1926 - 1945
Total Production:	M1911 Approximately 700,000 M1911A1 Dec. 1940 - Sep. 1945, 1,878,742
Manufacturers:	
M1911:	Colt, Springfield Armory, Remington UMC (Small number of pre-production prototypes made by North American Arms)
M1911A1:	Colt, Union Switch & Signal, Remington-Rand, Ithaca (500 made under "Educational Order" by Singer)

TO&E:

U.S. Army

Infantry Regiments	
Infantry Regiment (1944)	293
Glider Infantry (1942)	136
Glider Infantry (1944)	9
Motorized Infantry (1942)	213
Mountain Infantry (1944)	205
Parachute Infantry (1942)	1753
Parachute Infantry (1944)	11
Infantry Battalion	

Armored Infantry (1943)	3
Infantry (1944)	81
Parachute (1944)	2
Ranger Infantry (1944)	198
Separate (1943)	76
U.S. Marine Corps	
"D" Series Division (1942)	798
"E" Series Division (1943)	299
"F" Series Division (1944)	399
"G" Series Division (1945)	1707

Note: Many of the M1911 pistols were arsenal refurbished for use in WWII. .45 pistols were primarily issued to officers and non-commissioned officers.

Table #18
M1911 and M1911A1
Serial Numbers Assigned

Year	*Serial Number*	*Manufacturer*
1912	1 - 17250	Colt
1913	17251 - 60400	Colt
1914	60401 - 72570	Colt
	72571 - 83855	Springfield
	83856 - 102596	Colt
	102597 - 107596	Springfield
1915	107597 - 113496	Colt
	113497 - 120566	Springfield
	120567 - 125566	Colt
	113497 - 120566	Springfield
	120567 - 125566	Colt
	125567 - 133186	Springfield
1916	133187 - 137400	Colt
1917	137401 - 216986	Colt
1918	216987 - 594000	Colt
	1 - 13152	Remington-UMC
1919	13153 - 21676	Remington-UMC
	594001 - 629500	Colt
	629501 - 700000	Unknown
1924	700001 - 710000	Colt
1937	710001 - 712349	Colt
1938	712350 - 713645	Colt
1939	713646 - 717281	Colt
1940	717282 - 721977	Colt
1941	721978 - 756733	Colt
1942	756734 - 800000	Colt
	S800001 - S800500	Singer
	800501 - 801000	Assigned to H&R (Unused)
1943	801001 - 958100	Colt
	958101 - 1088725	US&S
	1088726 - 1208673	Colt
	1208674 - 1279673	Ithaca
	1279674 - 1279698	Re-numbered at Augusta Arsenal
	1279699 - 1441430	Remington-Rand
	1441431 - 1471430	Ithaca
	1471431 - 1609528	Remington-Rand
1944	1609529 - 1743846	Colt
	1743847 - 1890503	Ithaca
	1890504 - 2075103	Remington-Rand
1945	2075104 - 2134403	Ithaca
	2134404 - 2244803	Remington-Rand
	2244804 - 2380013	Colt
	2380014 - 2619013	Remington-Rand
	2619014 - 2693613	Ithaca

Note: Production of the M1911A1 pistol for the U.S. government stopped in September of 1945. It should also be noted that not all of the serial numbers in the assigned blocks were necessarily used. The above table will assist in determining the date that a M1911 or M1911A1 receiver was manufactured. The name of the manufacturer stamped on the slide and the assigned serial number for a particular maker should agree.

Table #19
M1903 Rifles

Operation:	Manual Bolt Action
Models:	M1903, M1903 Mark I, M1903A1, M1903 (Modified), M1903A3, M1903A4
Caliber:	.30 (".30-06")
Feeding Mechanism & Capacity:	Five round internal magazine, loaded by five round charger ("stripper clip") or single rounds.
Weight:	M1903, M1903A1 and M1903 (Modified); 8.69 pounds M1903A3; 8 pounds M1903A4; 9.38 pounds (with scope & acc.)
Overall Length:	43.5"
Barrel Length:	24"
Muzzle Velocity:	2800 f.p.s.
Classification:	"Substitute Standard" after adoption of M1. Declared "Limited Standard" in November, 1944. Declared "Obsolete" July 24, 1947. However the sniping versions remained Limited Standard well after the end of WWII.
Total Production:	Pre-WWII (Approx. 1.9 million)
WWII production:	1,415,593
Dates of Production:	
M1903:	1903 - 1929
M1903 Mark I:	Late 1918 to early 1920
M1903A1:	1929 to 1930s
M1903 (WWII):	Sep. 1941 to Dec. 1941 (Remington)
M1903 (Modified):	Dec. 1941 - Dec. 1942
M1903A3:	Dec. 1942 - Feb. 1944
M1903A4:	Jan. 1943 - Feb. 1944
Manufacturers:	Springfield (M1903, M1903 Mark I, M1903A1) Rock Island (M1903) Remington (M1903, M1903 (Mod.), M1903A3, M1903A4) Smith-Corona (M1903A3)

TO&E: During WWII, the M1903 rifle was generally issued in lieu of the M1 Garand when the latter was not available. (See TO&E of M1 rifle). However, the '03 also saw issue for grenade launching purposes and sniping use. A "D" (1942) Series U.S. Marine Division had an authorized allowance of 456 M1903 rifles and an identical number of grenade launchers authorized for these rifles.

In addition, Marine Scout-Snipers used sniping versions of the M1903 rifle.

The U.S. Army issued M1903 rifles with grenade launchers to many assistant squad leaders even after M1 rifles became more widely available. An Army rifle platoon generally had a marksman designated as a sniper and he was issued a M1903A4 rifle.

Note: Many pre-WWI vintage M1903 rifles were refurbished for use in World War II.

Table #20
M1917 "ENFIELD" RIFLE

Operation:	Manual Bolt Action
Caliber:	.30 (".30-06")
Feeding Mechanism & Capacity:	Five (or 6) round internal magazine loaded by a five round charger ("stripper clip") or by single rounds
Weight:	8.18 pounds
Overall Length:	46.3"
Barrel Length:	26"
Muzzle Velocity:	2930 f.p.s.
Classification:	Classed as "Substitute Standard" in 1928, "Limited Standard" in 1939 and officially declared "Obsolete" after WWII.
Dates of Production:	1917 - 1919
Total Production:	2,422,529
Manufacturers:	Winchester, Remington, Eddystone
Issuance:	Used during WWII as primarily a training rifle but a number were issued to American combat troops (chiefly artillery and mortar crewmen) early in the war, particularly in the North African campaign.

Note: While no M1917 rifles were made after 1919, large numbers were refurbished for use in WWII.

Table #21
M1 "GARAND" RIFLE

Operation:	Semiautomatic, gas operated
Caliber:	.30 (".30-06")
Feeding Mechanism & Capacity:	Eight round internal magazine fed by an eight round clip which is ejected after the last round has been fired.
Weight:	9.5 pounds
Overall Length:	43.6"
Barrel Length:	24"
Muzzle Velocity:	2800 f.p.s.
Classification:	"Standard" from the time of its adoption in 1936 until the adoption of the M14 rifle in 1957.
Dates of Production:	1936 - 1945 (remained in production after WWII)
Total Production (WWII):	Approximately 4,040,000
Manufacturers (WWII):	Springfield Armory and Winchester

TO&E:

U.S. Army

Divisions	*Number of Rifles*
"Triangular" Infantry Division (1941)	7327
"Square" Infantry Division (1941)	10047
Armored Division (1941)	2017
Infantry Regiments	
Infantry (1944)	1990
Glider Infantry (1942)	834
Glider Infantry (1944)	731
Motorized Infantry (1942)	2107
Mountain Infantry (1944)	1846
Parachute Infantry (1942)	1173
Parachute Infantry (1944)	886
Infantry Battalions	
Armored Infantry (1943)	478
Infantry (1944)	571
Parachute (1944)	280
Ranger Infantry (1944)	338
Separate (1943)	588

U.S. Marine Corps

Divisions	*# of M1 Rifles*
"D" Series	7406
"E" Series	8030
"F" Series	5436
"G" Series	6261

As stated, the authorized allotments of M1 rifles in Marine Corps service was not totally filled until well into 1943 and '03 rifles were used until sufficient numbers of Garands became available.

The M1 rifle was the basic weapon of the infantry squad and rifle company for most of World War II.

Note: The U.S. was the only nation which armed its troops primarily with a semiautomatic rifle during WWII.

Table #22
M1 SERIAL NUMBERS

Approx. serial numbers at the end of each month's production.
Reproduced from The M1 Garand: World War II *by Scott A. Duff. Used by Permission.*

Springfield Armory

Year & Month		*Serial Number*
1937	Aug.	120
	Sept.	307
	Oct.	539
	Nov.	696
	Dec.	1034
1938	Jan.	1186
	Feb.	1338
	Mar.	1809
	Apr.	2213
	May	2406
	Jun.	2911
	Jul.	2911
	Aug.	3537
	Sep.	4386
	Oct.	5242

	Nov.	6072
	Dec.	6972
1939	Jan.	7715
	Feb.	8762
	Mar.	9893
	Apr.	10703
	May	11511
	Jun.	12848
	Jul.	12911
	Aug.	14823
	Sep.	17010
	Oct.	19410
	Nov.	21293
	Dec.	23567
1940	Jan.	26729
	Feb.	30008
	Mar.	33790
	Apr.	38034
	May	41679
	Jun.	46221
	Jul.	51970
	Aug.	59868
	Sep.	68054
	Oct.	78306
	Nov.	90177
	Dec.	100000 & 165501 to 169073
1941	Jan.	183518
	Feb.	197811
	Mar.	211228
	Apr.	228527
	May	248757
	Jun.	269686
	Jul.	296252
	Aug.	324301
	Sep.	349442
	Oct.	377258
	Nov.	401529
	Dec.	429811
1942	Jan.	462737
	Feb.	498216
	Mar.	542494
	Apr.	588879
	May	638679
	Jun.	691401
	Jul.	749779
	Aug.	809016
	Sep.	872343
	Oct.	940250
	Nov.	1008899
	Dec.	1090310
1943	Jan.	1169091
	Feb.	1200000 & 1357474 to 1396255
	Mar.	1469177
	Apr.	1547452
	May	1629565
	Jun.	1710012
	Jul.	1786469
	Aug.	1877654
	Sep.	1978407
	Oct.	2092825
	Nov.	2204430
	Dec.	2305849 & 2410000 to 2420191
1944	Jan.	2543412
	Feb.	2634316
	Mar.	2723004
	Apr.	2810628
	May	2900312
	Jun.	2981126
	Jul.	3051952
	Aug.	3114434
	Sep.	3180532
	Oct.	3242497
	Nov.	3302641
	Dec.	3359159
1945	Jan.	3450503
	Feb.	3531489
	Mar.	3627442
	Apr.	3717867
	May	3797768
	Jun.	3875601
	Jul.	unknown
	Aug.	3888081

Winchester Repeating Arms

Year & Month		*Serial Number*
1941	Jan.	100501
	Feb.	100831
	Mar.	102701
	Apr.	104901
	May	107801
	Jun.	111501
	Jul.	115501
	Aug.	120111
	Sep.	122081
	Oct.	126130
	Nov.	131130
	Dec.	137960
1942	Jan.	144100
	Feb.	149130
	Mar.	155310
	Apr.	162190
	May	to 165500 & 1200001 to 1203692
	Jun.	1210472
	Jul.	1218972
	Aug.	1228982
	Sep.	1241002
	Oct.	1254002
	Nov.	1266502
	Dec.	1276102
1943	Jan.	1282762
	Feb.	1294762
	Mar.	1309772
	Apr.	1323872
	May	1336882

	Jun.	1349982
	Jul.	1364982
	Aug.	to 1380000 & 2305850 to 2305932
	Sep.	2138032
	Oct.	2334032
	Nov.	2349632
	Dec.	2364642
1944	Jan.	2379642
	Feb.	2394642
	Mar.	2409642
	Apr.	2424642
	May	2349642
	Jun.	2454642
	Jul.	2469642
	Aug.	2484642
	Sep.	2499642
	Oct.	2513822
	Nov.	2523942
	Dec.	2533142
1945	Jan.	Approximately 2536000 Winchester M1 rifles made from mid-Jan. of 1945 through the end of production in June of 1945 were serially numbered in the 1600000 to 1640000 range.

Note: The above serial table will enable accurate determination of the month and year that an M1 receiver was manufactured. On original rifles, the date on the barrel should generally not vary by more than three or four months from the date that the receiver was manufactured. (Winchester barrels were not dated).

Table #23
World War II Inspector's Cartouches for M1 Garand Rifles

Springfield Armory

Cartouche	*Names and Dates*	*Approx. Serial Range*
SA SPG	Stanley P. Gibbs 1936 - Mid 1940	81 - 75,000
SA GHS	Col. Gilbert H. Stewart Mid 1940 - June 1942	75,000 - 700,000
SA EMcF	Col. Earl McFarland June 1942 - July 1943	700,000 - 1,800,000
SA GAW	Col. George A. Woody July 1943 - Oct. 1944	1,800,000 - 3,260,000
SA NFR	Gen. Norman F. Ramsey Oct. 1944 - Nov. 1945	3,260,000 - 3,900,000

Winchester Repeating Arms

WRA RS	Col. Robert Sears July 1940 - June 1941	100501 - 111500
WRA WB	Col. Waldemar Broberg July 1941 - June 1942	111500 - 1218971
WRA GHD	Col. Guy H. Drewry July 1942 - June 1945	1218972 - End of WWII Production

Note: On original WWII M1 rifles, the inspector's cartouche on the stock should correspond with the vintage of the receiver and the barrel dates.

Table #24
Model of 1941 Johnson Rifle

Operation:	Semiautomatic, Recoil operated
Caliber:	.30 (".30-06")
Feeding Mechanism & Capacity:	Non-detachable 10-round rotary magazine. Load by five round chargers ("stripper clips") or single rounds.
Weight:	9.5 pounds
Overall Length:	45.87"
Barrel Length:	22"
Muzzle Velocity:	2770 f.p.s.
Classification:	Not adopted by the U.S. Army and procured only in limited numbers by the Marine Corps and the OSS.
Dates of Production:	1941 - 1943
Total Production:	Estimated production of 30,000 but only a few thousand were procured by the Marine Corps and OSS.
Manufacturer:	Cranston Arms Company
TO&E:	Issued primarily to Marine airborne and a few Raider units early in WWII. No official TO&E requirements.

Note: Most of the M1941 Johnson rifles were produced for the Dutch government but saw limited use.

Table #25
M1 Carbine

Operation:	Semiautomatic, gas operated (M1 and M1A1) Selective Fire, gas operated (750-775 r.p.m) (M2)
Caliber:	.30
Feeding Mechanism & Capacity:	15 round and 30 round detachable box magazines
Weight:	5 pounds, 1 oz. (M1) 5 pounds, 5 oz. (M1A1) 5 pounds, 2 oz. (M2)
Overall Length:	35.6"
Barrel Length:	18"
Muzzle Velocity:	1970 f.p.s.
Classification:	"Standard" (WWII)
Dates of Production:	August, 1941 - mid-1945 (M1) October, 1942 - December, 1944 (M1A1) October, 1944 - May, 1945 (M2)
Total Production:	6,079,648 including approx. 140,000 M1A1s and approx. 217,500 M2s.

Manufacturers: Winchester (M1 and M2), Inland (M1, M1A1 and M2), Saginaw, Irwin-Pedersen, IBM, Rock-Ola, Underwood, Quality Hardware, Standard Products and National Postal Meter.

TO&E:

U.S. Army

Infantry Regiments	*Number of Carbines*
Infantry (1944)	836
Glider Infantry (1942)	635
Glider Infantry (1944)	814
Motorized Infantry (1942)	1107
Mountain Infantry (1944)	896
Parachute Infantry (1942)	495
Parachute Infantry (1944)	1098
Infantry Battalions	
Armored Infantry	394
Infantry	219
Parachute	310
Ranger Infantry	N/A
Separate	237

U.S. Marine Corps

Divisions	
"D" Series	5285
"E" Series	11074
"F" Series	10953
"G" Series	10371

Note: The carbine was produced in larger numbers than any other U.S. small arm of the Second World War.

Table #26

COMBAT SHOTGUNS

Operation:	Manual slide ("pump") action; Winchester Models 97 and 12, Stevens Models 520-30 and 620A, Remington M31 and Ithaca M37. Semiautomatic, recoil operated; Remington Model 11 and Savage M720
Caliber:	12 gauge
Feeding Mechanism & Capacity:	Four or Five round integral tubular magazine.
Weight:	M97, M520-30, M620A, M31; Eight Pounds M720, M11; Seven Pounds, Ten oz. M12; Seven Pounds, Eight oz. M37; Seven Pounds
Overall Length:	3'4"
Barrel Length:	20"
Classification:	"Standard," August, 1941
Dates of Production:	1941 - 1945 (M97, M12, M31, M11) 1941 - 1944 (M520-30, M620A, M720) 1941 - 1942 (M37)
Total Production:	Approximately 500,000

TO&E:

U.S. Army

No formal TO&E requirements were instituted for shotguns in the U.S. Army. Infantry units from the Rifle Company and up were authorized two or more "trench" or riot shotguns. These were issued at the discretion of the unit commander.

U.S. Marine Corps

The standard "E", "F" and "G" Series Marine Corps Divisions of WWII were authorized 306 combat shotguns, typically either the Winchester M97 or M12.

Note: All of the military shotguns were procured under contract from civilian manufacturers.

Table #27

THOMPSON SUBMACHINE GUN

Operation:	Selective Fire (Full Automatic and Semiautomatic) (600-725 r.p.m. M1928A1) (700-800 r.p.m. M1 & M1A1)
Caliber:	.45 ACP
Feeding Mechanism and Capacity:	50 round detachable drum, 20 & 30 round detachable box magazines (M1928A1); 20 and 30 round detachable box magazines (M1 and M1A1)
Weight:	11 pounds (M1928A1) 10 pounds, 7 oz. (M1 & M1A1)
Overall Length:	2' 9.6875" (M1928A1) 2' 7.875" (M1 & M1A1)
Barrel Length:	10.5"
Muzzle Velocity:	920 f.p.s.
Classification:	M1928A1; Standardized for "Limited Procurement" March, 1932. Declared "Standard" September, 1938. M1 Thompson adopted as "Standard" April, 1942. M1A1 adopted as "Standard" October, 1942. Thompsons ordered withdrawn from service in April of 1945 to be replaced by the M3/M3A1 submachine guns.
Dates of Production:	1940 - 1943 (M1928A1) 1942 - 1943 (M1) 1942 - 1944 (M1A1)
Total Production:	562,511 (M1928A1) 285,480 (M1) 539,142 (M1A1)
Manufacturers:	Auto-Ordnance and Savage

TO&E:

U.S. Army

Infantry Regiments	*Number of Submachine Guns*
Glider Infantry (1944)	36
Mountain Infantry (1944)	63
Parachute Infantry (1942)	154
Parachute Infantry (1944)	54
Infantry Battalions	
Armored Infantry	126

Parachute	18
Ranger Infantry	56

U.S. Marine Corps

Divisions	*# of Thompson Submachine Guns*
"E" Series	78
"F" Series	49
"G" Series	49

Note: Many of the M1 Thompson submachine guns were converted to M1A1 configuration.

Table #28
M3 AND M3A1 SUBMACHINE GUNS

Operation:	Full Automatic, Blowback
Caliber:	.45 ACP
Feeding Mechanism & Capacity:	30-round detachable box magazine
Weight:	8 pounds, 1 oz. (M3) 8 pounds (M3A1)
Overall Length:	2'5.8125" (Stock extended) 1'10.8125" (Stock retracted)
Barrel Length:	8"
Muzzle Velocity:	920 f.p.s.
Classification:	M3; "Standard" Dec., 1942. "Limited Standard," Dec., 1944. M3A1; "Standard" Dec., 1944.
Dates of Production:	1942 - 1944 (M3) 1944 - 1945 (M3A1)
Total Production:	605,664 (M3) 15,469 (M3A1 WWII prod.)
Manufacturers (WWII):	Guide Lamp
TO&E:	Adoption of the M3/M3A1 relegated the Thompson submachine guns to "Limited Standard" or "Substitute Standard."

Note: Few of the later M3A1 variants were fielded during WWII.

Table #29
REISING SUBMACHINE GUNS

Operation:	Selective Fire (Full automatic & semiautomatic)
Caliber:	.45 ACP
Feeding Mechanism & Capacity:	12 and 20 round detachable box magazines
Weight:	6 pounds, 12 oz. (M50) 6 pounds, 4 oz. (M55)
Overall Length:	35.75" (M50) 31" (M55 unfolded) 22.5" (M55 folded)
Barrel Length:	11" (M50) 10.5" (M55)
Classification:	Adopted by the U.S. Marine Corps for issue to Raider and airborne units. Not adopted by the U.S. Army.
Dates of Production:	1941 - 1943
Manufacturer:	Harrington & Richardson
TO&E:	

U.S. Marine Corps	*# of Reising Submachine Guns*
"D Series" Division (1942)	4208

Note: No Reising SMGs were carried on the U.S. Marine TO&E lists after 1942 although some remained in use until at least 1943.

Table #30
BROWNING AUTOMATIC RIFLE (BAR)

Operation:	M1918 & M1918A1 - Selective Fire, Gas Operated; Semiautomatic and fully automatic at approx. 550 r.p.m. M1918A2 - Fully Automatic, Gas Operated 300-450 r.p.m. (slow rate) 500-650 r.p.m. (fast rate)
Caliber:	.30 (".30-06")
Feeding Mechanism & Capacity:	20 round detachable box magazine
Weight:	16 pounds (M1918); 18.5 pounds (M1918A1); 19.4 pounds (M1918A2)
Overall Length:	47" (M1918 and M1918A1); 47.8" (M1918A2)
Barrel Length:	24"
Muzzle Velocity:	2800 f.p.s.
Classification:	M1918 adopted late 1917, Declared "Obsolete" July, 1945. M1918A1 Standardized 1937, Declared "Obsolete" July, 1945 M1918A2 Standardized 1940, remained "Standard" after WWII.
Dates of Production:	M1918: late 1917 to 1919 M1918A1: 1937 M1918A2: 1940 to 1945
Total Production:	M1918: 102,125 M1918A1: very limited production M1918A2 (WWII): 208,380
Manufacturers:	M1918: Winchester, Colt, Marlin-Rockwell M1918A1: Converted from M1918 BARs M1918A2 (WWII): IBM, New England Small Arms

TO&E:

U.S. Army

One BAR issued to each infantry rifle squad. The authorized allowance for Browning Automatic Rifles per U.S. Army infantry regiment as of March, 1943 was 81. Many changes regarding issuance of BARs were made. For example, some infantry platoons included "fire teams" which were equipped with three BARs per squad.

U.S. Marine Corps

Like the Army, the number of BARs in a Marine unit could vary widely. The conventional U.S. Marine Corps Divisional TO&E for BARs during WWII was:

Division	*# of BARs*
"D" Series Division	513
"E" Series Division	558
"F" Series Division	853
"G" Series Division	867

Note: The M1918A2 remained the standard squad automatic

weapon after WWII.

Table #31
M1941 Johnson Light Machine Gun

Operation:	Selective Fire, Recoil Operated Semiautomatic or Fully automatic at the rate of 400-450 r.p.m.
Caliber:	.30 (".30-06")
Feeding Mechanism and Capacity:	20-round detachable box magazine
Weight:	13 pounds (approx.)
Overall Length:	42"
Barrel Length:	22"
Muzzle Velocity:	2800 f.p.s.
Classification:	Not adopted by the U.S. Army although a small number were acquired by the First Special Service Force. The weapon was adopted by the U.S. Marine Corps in mid-1941, chiefly for issue to Raider and airborne units.
Dates of Production:	Mid-1941 to early 1944
Total Production:	Approximately 10,000 made but much smaller number acquired by the United States military.
Manufacturer:	Cranston Arms

TO&E:

U.S. Army

Not adopted by the U.S. Army. 147 M1941 Johnson LMGs were acquired by the First Special Service Force during WWII.

U.S. Marine Corps

82 M1941 Johnson LMGs were authorized for a Marine "D Series" (1942) Division. No official authorization after 1943.

Note: A number of M1941 Johnson Light Machine Guns were also acquired by the Office of Strategic Services (OSS) during WWII.

Table #32
M1917A1 Machine Gun

Operation:	Fully automatic (450-600 r.p.m.), recoil operated, water cooled
Caliber:	.30 (".30-06")
Feeding Mechanism and Capacity:	250-round belt
Weight (with tripod and water):	93 pounds (approx.)
Overall Length:	38.5"
Barrel Length:	24"
Muzzle Velocity:	2800 f.p.s.
Classification:	"Standard"
Dates of Production:	1936 - 1945
Total Production (WWII):	55,859 (Nearly 70,000 earlier M1917 machine guns were converted to M1917A1 specs.)
Manufacturers:	Rock Island Arsenal, Colt, Brown-Lipe-Chapman

TO&E:

U.S. Army

Infantry Divisions	*Number of M1917A1 Machine Guns*
"Triangular" Division (1941)	179
"Square" Division (1941)	192
Armored Division (1941)	364
Infantry Regiments	
Infantry (1944)	24
Glider Infantry (1942)	8
Glider Infantry (1944)	8
Motorized Infantry (1942)	24
Mountain Infantry (1944)	24
Parachute Infantry (1944)	4
Infantry Battalions	
Armored Infantry (1943)	37
Infantry (1944)	8
Separate (1943)	8

U.S. Marine Corps

Division	
"D" Series	544
"E" Series	108
"F" Series	162
"G" Series	162

Table #33
M1919A4 Machine Gun

Operation:	Fully Automatic (400-550 r.p.m.), recoil operated, air cooled.
Caliber:	.30 (".30-06")
Feeding Mechanism & Capacity:	250-round belt
Weight (with tripod):	45 pounds
Overall Length:	41"
Barrel Length:	24"
Muzzle Velocity:	2800 f.p.s.
Classification:	"Standard"
Dates of Production:	mid-1930 - 1945
Total Production (WWII):	389,859
Manufacturers:	Saginaw, Colt, Buffalo Arms

TO&E:

U.S. Army

Infantry Regiments	*Number of M1919A4 Machine Guns*
Infantry (1944)	18
Glider Infantry (1942)	12
Glider Infantry (1944)	12
Motorized Infantry (1942)	18
Mountain Infantry (1944)	36
Parachute Infantry (1942)	132
Parachute Infantry (1944)	132
Infantry Battalions	
Armored Infantry (1943)	23
Infantry (1944)	6
Parachute (1944)	44

Ranger Infantry (1944)	24
Separate (1943)	6

U.S. Marine Corps

Division	
"D" Series	656
"E" Series	682
"F" Series	302
"G" Series	356

Table #34
M1919A6 Machine Gun

Operation:	Fully Automatic (400-500 r.p.m.), recoil operated air cooled.
Caliber:	.30 (".30-06")
Feeding Mechanism & Capacity:	250-round belt
Weight:	32.5 pounds
Overall Length:	53"
Barrel Length:	24"
Muzzle Velocity:	2800 f.p.s.
Classification:	"Substitute Standard", April 10, 1943
Dates of Production:	Mid-1943 - 1945
Total Production (WWII):	43,479
Manufacturer:	Saginaw Steering Gear Div. of GM

TO&E:
Issued later in WWII as substitute for the M1919A4 light machine gun and, occassionally, for the M1918A2 BAR.

Note: A number of M1919A4 machine guns were converted to M1919A6 specifications during WWII.

Table #35
M2 HB Machine Gun

Operation:	Selective Fire; Semiautomatic or Fully Automatic at the rate of 450-550 r.p.m., recoil operated, air cooled
Caliber:	.50
Feeding Mechanism & Capacity:	110-round metallic link belt
Weight:	128 pounds (with tripod)
Overall Length:	65.1"
Barrel Length (WWII):	45"
Muzzle Velocity:	2930 f.p.s.
Classification:	Adopted as "Standard" in 1933
Dates of Production:	mid-1930s to 1945
Total Production (WWII):	347,524
Manufacturers:	AC Spark Plug, Brown-Lipe-Chapman, Frigidaire, Buffalo Arms, Colt, Guide Lamp and Kelsey-Hayes

TO&E:

U.S. Army

Divisions	*Number of .50 Caliber Machine Guns*
"Triangular" Infantry Division (1941)	148
"Square" Infantry Division (1941)	144
Infantry Regiments	
Infantry (1944)	35
Glider Infantry (1942)	3
Glider Infantry (1944)	3
Motorized Infantry (1942)	34
Mountain Infantry (1944)	7
Infantry Battalions	
Armored Infantry (1943)	43
Infantry	6
Separate	8

U.S. Marine Corps

Divisions	
"D" Series	360
"E" Series	343
"F" Series	161
"G" Series	162

Table #36
WWII Production Statistics for Infantry Machine Guns

Type	1941	1942	1943	1944	1945	Total
.30 M1917A1	0	12068	30724	2	11065	53859
.30 M1919A4	14385	143887	127379	73460	30240	389251
.30 M1919A6	0	0	0	23329	20150	43479
.50 M2 HB	2440	70639	107277	120664	45524	347524

Table #37
Bazooka

Operation:	Rocket launcher; electrically fired
Diameter of bore:	2.36"
Weight:	M1 and M1A1; 18 pounds M9/M9A1; 15 pounds, 14 oz. M18; 10 pounds, 5 oz.
Overall Length:	M1/M1A1: 54" M9/M9A1/M18: 61" assembled 21.5" disassembled
Muzzle Velocity:	Approximately 265-275 f.p.s. (@70 degrees Fahrenheit)
Dates of Production:	M1: 1942 - mid-1943 M1A1: mid-1943 - early 1944 M9: early 1944 M9A1: early-1944 - 1945
Total Production:	Approximately 460,000
Manufacturers:	General Electrical, Cheney Bigelow and (reportedly) Philco Metal Products

TO&E:

U.S. Army

Infantry Regiments	*Number of 2.36" Bazookas*
Infantry (1944)	112
Glider Infantry (1944)	81
Mountain Infantry (1944)	60
Parachute Infantry (1944)	73
Infantry Battalions	
Armored Infantry (1943)	74
Infantry (1944)	29

Parachute (1944)	21
Ranger Infantry (1944)	14
Separate (1943)	27

U.S. Marine Corps

Divisions

"D" Series (M1 Bazooka)	132
"E" Series (M1 Bazooka)	243
"F" Series (M1A1 Bazooka)	172
"G" Series (M9A1 Bazooka)	153

Table #38
Boys Antitank Rifle (Mark I and Mark II)

Operation:	Manually operated bolt action
Caliber:	.55
Feeding Mechanism & Capacity:	5-round detachable box magazine
Weight:	56 pounds, 1 oz. (unloaded)
Overall Length:	63.5"
Barrel Length:	36"
Muzzle Velocity:	3250 f.p.s.
Classification:	Not officially adopted by the United States
Dates of Production:	1937 - 1942
Manufacturers:	Enfield and BSA (England); Inglis (Canada)

TO&E:

U.S. Army: The TO&E for a U.S. Army Ranger Infantry Battalion authorized 3 Boys .55 caliber antitank rifles.

U.S. Marine Corps: One Boys AT rifle was issued to each Marine Raider company.

Note: The number of Boys AT rifles procured by the U.S. Army and Marine Corps during WWII is not known but is believed to be small. The rifles acquired for U.S. service were reportedly manufactured by the Canadian firm of Inglis.

Table #39
81mm M1 Mortar

Weight (Complete):	136 pounds
Length:	3'9.5"
Muzzle Velocity (HE):	700 f.p.s.
Max. Range (HE):	3290 yards
Rate of Fire:	Normal: 18 r.p.m. Maximum: 30-35 r.p.m.
Classification:	"Standard"
Dates of Production:	1940 -1945
Manufacturers:	Watervliet Arsenal, Pullman Standard Car Manufacturing Co., A.B. Farquhar Company

TO&E:

U.S. Army

Divisions	*Number of 81mm Mortars*
"Triangular" Infantry Division (1941)	18
"Square" Infantry Division (1941)	48
Armored Division (1941)	20
Infantry Regiments	
Infantry (1944)	18
Glider Infantry (1942)	12
Glider Infantry (1944)	12
Motorized Infantry (1942)	18
Mountain Infantry (1944)	18
Parachute Infantry (1942)	12
Parachute Infantry (1944)	12
Infantry Battalions	
Armored Infantry (1943)	1
Infantry (1944)	6
Parachute (1944)	4
Ranger Infantry (1944)	6
Separate (1943)	6

U.S. Marine Corps

Divisions

"D" Series	36
"E" Series	36
"F" Series	36
"G" Series	36

Table #40
60mm M2 Mortar

Weight (Complete):	42 pounds
Length:	28.6"
Muzzle Velocity (HE):	535 f.p.s.
Max. Range (HE):	1985 yards
Rate of Fire:	Normal: 18 r.p.m. Maximum: 30-35 r.p.m.
Classification:	"Standard"
Dates of Production:	1940 - 1945
Manufacturers:	Read Machinery Co., Kennedy-Van Saun Engineering & Manufacturing Co., Firestone Tire & Rubber

TO&E:

U.S. Army

Divisions	*Number of 60mm Mortars*
"Triangular" Infantry Division (1941)	81
"Square" Infantry Division (1941)	108
Armored Division (1941)	21
Infantry Regiments	
Infantry (1944)	37
Glider Infantry (1942)	24
Glider Infantry (1944)	24
Motorized Infantry (1942)	27
Mountain Infantry (1944)	27
Parachute Infantry (1942)	27
Parachute Infantry (1944)	27

U.S. Marine Corps

Divisions

"D" Series	63
"E" Series	81
"F" Series	117

"G" Series	117

Table #41
FLAME THROWERS

Weight (loaded):	E1R1; M1; M1A1: 60 pounds (approx.)
	M2-2: 70 pounds
Range:	E1R1: M1: 15 - 20 yards
	M1A1: 40 - 50 yards
	M2-2: 50 - 60 yards
Dates of Production:	E1R1: 1941
	M1: Early to mid-1942
	M1A1: mid-1942 to early 1944
	M2-2: early 1944 -1945
	Total Production from 1-1-42 to 12-31-45: 41,452
Approximate production by type:	
	E1: Several hundred
	M1: 2,500
	M1A1: 14,000
	M2-2: 24,500
Manufacturers:	E1R1: Kincaid Company
	M1: E.C. Brown Co.
	M1A1: Beattie Mfg. Co. and E.C. Brown Co.
	M2-2: Beattie Mfg. Co., E.C. Brown Co. and R.F. Sedgley Co.

TO&E:

U.S. Army

Pacific Theater:	*Authorized number of flame throwers*
Infantry Division (1942)	24
Infantry Division (1943)	60
Infantry Division (1944)	192
Infantry Division (1945)	141
European Theater:	
Infantry Division*	24
Airborne Division	12
Armored Division	18
Engineer Combat Battalion	24
Ranger Battalion	6

*The 1st Infantry Division was allocated 150 flame throwers for the Normandy Invasion although few were employed.

Despite the official TO&E authorizations, an analysis conducted in February of 1945 revealed that the actual number of flame throwers "on hand" in European Infantry Divisions ranged from 0 to 34.

U.S. Marine Corps

Divisions	*Number of Flame Throwers*
"E" Series	24
"F" Series	243
"G" Series	108

Note: As can readily be seen, the flame thrower saw a great deal more use in the Pacific Theater as opposed to the European Theater.

Table #42
COLLECTING ASPECTS OF CLASS III, DESTRUCTIVE DEVICE AND CURIO AND RELIC WEAPONS

Machine Guns and Destructive Devices

There is a great deal of confusion and mis-information regarding the legality of collecting many of the weapons discussed in the preceding pages. The following discussion will elaborate on the legal aspects of collecting machine guns and "Destructive Devices" as defined by the National Firearms Act (NFA) of 1934. It must be stressed that this information is not intended to constitute legal advice and any questions should be referred to a licensed dealer in such weapons, the appropriate Federal agency (Bureau of Alcohol, Tobacco and Firearms) or an attorney knowledgeable in such matters. It must also be pointed out that a number of local, county and state governments have laws limiting or prohibiting the ownership and possession of such weapons and a person desiring to own one of these NFA weapons should familiarize himself with any applicable local and/or state laws. For the purposes of this discussion, there are two basic types of weapons that require special approval and licensing to legally own: Machine Guns and Destructive Devices.

The definition of a machine gun as stated in the National Firearms Act is

The term machine gun means any weapon which shoots, is designed to shoot, or can be readily restored to shoot, automatically more than one shot, without manual reloading, by a single function of the trigger.

Defining a Destructive Device is a bit more involved. The NFA defines it as follows:

The term "Destructive Device" means:

(1) Any explosive, incendiary, or poison gas
- *(a) bomb*
- *(b) grenade*
- *(c) rocket having a propellent charge of more than four ounces.*
- *(d) missile having an explosive or incendiary charge of more than one-quarter ounce.*
- *(e) mine*
- *(f) similar device*

(2) Any type of weapon by whatever name known which will, or which may be readily converted to, expel a projectile by the action of an explosive or other propellent, the barrel or barrels of which have a bore more than one-half inch in diameter, except a shotgun or shotgun shell which the Secretary or his delegate finds is generally recognized as particularly suitable for sporting purposes.

The U.S. infantry weapons of World War II that fall into the Machine Gun category are obviously all of the automatic rifles (BAR and M1941 Johnson), the submachine guns (Thompson, Reising, M3/M3A1, M2, UD-42), the M2 (and M3) carbine, and all of the .30 and .50 caliber machine guns (M1917A1, M1919A4, M1919A6, M2 HB, etc.).

The weapons classified as Destructive Devices include mortars, mortar shells, bazookas, bazooka rockets, grenades, recoilless rifles and recoilless rifle ammunition with explosive charges. Addi-

tionally, the .55 caliber Boys Antitank rifle is also classified as a Destructive Device since its bore is larger than 0.5 inch (.50 caliber). Grenades, mortar shells and bazooka rockets that have been rendered inert are not classified as Destructive Devices. Any questions regarding the status of a weapon should be referred to the BATF.

As stated, many people have erroneous ideas regarding the legality of collecting machine guns and destructive devices. Some people believe that ownership of such weapons is totally outlawed while others are of the opinion that such weapons can be sold at the corner pawn shop or local gun show with no restrictions. Both perceptions are incorrect. *Federal* law does allow for the transfer and possession of such weapons but strict rules must be followed.

A person (not licensed as Dealer in machine guns or Destructive Devices) wishing to acquire a machine gun or destructive device should first ascertain that no local or state laws preclude ownership of such weapons. Federal approval for transfer will not be granted if such laws are violated. Assuming no local restrictions, the following is the general procedure that must be followed.

The first and most obvious step is to find the type of weapon desired for purchase. The weapon must already be properly registered with the Treasury Department in Washington, DC. If a weapon is not so registered, it cannot be subsequently registered and legal ownership is not possible. For the sake of this discussion, we will assume that a potential buyer finds the desired weapon being offered for sale by an out-of-state licensed dealer. Many dealers attend some of the larger (and smaller) gun shows and regularly advertise in such publications as the *Shotgun News* and *Machine Gun News*. The dealer is contacted and a price is agreed upon.

Typically, the entire purchase price (or a previously agreed upon portion) is paid to the dealer to hold the weapon while the approval process is going on. Most dealers will refund all or most of the purchase price if the potential buyer is denied approval, but this should be agreed upon in writing prior to committing to a transaction. If the dealer selling the weapon is out of state, the buyer must contact a dealer operating within his state and make arrangements for the out of state dealer to first sell the desired weapon to the in-state dealer. The in-state dealer will then hold the weapon for the buyer until Federal approval has been obtained. Most in-state dealers will charge a modest fee for their services as long as the out-of-state dealer (the seller) is paid in full in advance.

With the desired weapon selected and paid for, the registration process begins. An Application for Tax Paid Transfer and Registration of Firearm (BATF Form 4), should be obtained from the dealer or the BATF and submitted in duplicate. The Form 4 lists the Transferee's (Buyer's) name and address and the Transferor's (Seller's) name and address. A description of the firearm or destructive device is given, including the name and address of the manufacturer, type of firearm or weapon (machine gun, destructive device, etc.), caliber, model, overall length, length of barrel and serial number. All weapons must have a serial number. Some destructive devices registered previously, particularly under the 1968 Amnesty, that did not originally have a serial number were marked with a serial number assigned by the BATF. The transferee's federal firearms license number and BATF identification number (if any) and the transferor's federal firearms license number and BATF identification number (if any) are given. Both the transferee and transferor must sign and date the form. The applicant (transferee) must state his reason(s) for wishing to possess the firearm or device. Stating "For collecting purposes" is generally sufficient. A recent passport-type photograph must be affixed to each Form 4. Finally, a Chief Law Enforcement Officer must certify that he has no reason to believe that the applicant will use the weapon or device for other than lawful purposes and there are no state or local laws preventing such ownership. Typically, a Chief Law Enforcement Officer is defined as a Chief of Police, Sheriff, District Attorney or some similar authority. Some people have reported problems obtaining this statement either because the officer does not understand that he is not "approving" the application but merely certifying that he does not have the knowledge that the weapon will be used illegally or because the officer does not wish to have such weapons in his municipality or county. Legal action has sometimes resulted from such arbitrary refusals to sign the certification section of the form but, as a general rule, most such authorities will go along if approached in the proper manner.

Along with the completed (in duplicate) Form 4 a standard FBI FD-258 Fingerprint Form (in duplicate) should be completed. This must be done by a law enforcement agency (police department, sheriff's office, etc). The two Form 4s and fingerprint cards are then mailed along with a check in the amount of $200.00 to the proper BATF office. The BATF should be contacted to obtain the correct address. The $200 is for payment of the Federal transfer tax. This is a one-time tax and no subsequent taxes are due. If the owner should subsequently sell the weapon, the new transferee must again pay the tax as part of the transfer process.

The time for the approval process varies widely. A rough estimate is six months. Some approvals have been known to be much faster while others take even longer. Upon approval, the dealer is notified and one of the Form 4s with an attached and cancelled $200 tax stamp is returned for delivery to the transferee. The dealer can then transfer the weapon to the approved buyer after the standard Form 4473 is filled out. The Form 4473 is the same form used to record the sale of any unregulated firearm. From that point on, the weapon is legally registered to the transferee as listed on the Form 4 and is legally considered the same as any other unregulated firearm *if in the possession of the transferee.* It is a wise idea to have the approved Form 4 (or a photocopy) on hand with the weapon at all times.

Prior to a change in the Federal law, many "Dewats" (Deactivated War Trophies) were found for sale on the collector's market. Most of these Dewats were machine guns and similar weapons that had their bolts welded or otherwise altered to prevent them from being fired. The law no longer provides for the registration of new Dewats, although the ones currently registered may be transferred following the above procedure. The only difference is that the $200 transfer tax does not have to be paid on the transfer of a registered Dewat. Dewats should not be confused with bazookas, mortars and other weapons which have been Demilled. The demilling process renders the weapon utterly incapable of ever being reasonably restored back into firing condition. The actual demilling process may vary but it typically involves boring a hole or holes in the tube or chamber portion of the weapon. The hole or holes must be at least as big as the bore diameter of the weapon. Also, the bore is permanently obstructed, usually by welding metal rods in the barrels. Dewats, on the other hand, could be (and often were when the law permitted) restored to firing condition with varying degrees of difficulty. Demilled weapons do not require any sort of Federal registration or regulation.

Curios and Relics

There is a Federal regulation which allows a person to apply for a Curio and Relics (C&R) collector's license. Forms to apply for such licenses are available from the BATF and approval is generally granted assuming a person is not restricted from owning firearms (convicted felon, drug user, etc.). Licensed C&R collectors can obtain weapons classified as Curios and Relics through the mails and other similar channels without having to go through a licensed gun dealer.

The following definition of Curios and Relics is found in the Gun Control Act of 1968.

As set out in the Federal regulations (27 CRF 178.11), curios or relics include firearms which have special value to collectors. These firearms have special value because they possess some qualities not ordinarily associated with firearms intended for sporting use or as offensive or defensive weapons. To be recognized as curios or relics, firearms must: (1) Have been manufactured at least 50 years prior to the current date, but not *including replicas thereof; or (2) Be certified by the curator of a municipal, State or Federal museum which exhibits firearms to be curios or relics of museum interest or; (3) Derive a substantial part of their monetary value from the fact that they are novel, rare, or bizarre, or from the fact of their association with some historical figure, period, or event.*

The BATF has an extensive listing of weapons classified as Curios and Relics. Of particular interest to collectors of military weaponry, it should be noted that the BATF has expanded the definition of curios and relics to include

(1) All original military bolt-action and semi- automatic rifles manufactured between 1899 and 1946.

(2) All properly marked and identified semi-automatic pistols and revolvers used by, or manufactured for, any military organization prior to 1946.

(3) All shotguns, properly marked and identified as having been manufactured for any military organization prior to 1946 and in their original military configuration only.

The above list covers all U.S. (and foreign) military rifles, pistols, carbines (except the M2 and M3 carbines) and shotguns of World War II and earlier periods. This is not to imply only licensed collectors can possess Curio and Relic weapons. Anyone who can legally own a firearm can possess such weapons but must go through a licensed dealer to purchase them through the mail or other similar means.

To slightly confuse the issue, some National Firearms Act (NFA) fully automatic weapons and Destructive Devices are also classified as Curios and Relics. Some of these include:

Mark 1 Boys .55 caliber Antitank rifles
WWII bazookas (M1, M1A1, M9/M9A1 and M18)
All military issue Thompson submachine guns
M50 and M55 Reising submachine guns
UD-42 submachine guns
Original M2 carbines (not converted M1 carbines)
M1941 and M1944 Johnson LMGs
M1 and M2 mortars
M1918 and M1918A2 BARs
M1917 and M1917A1 machine guns
M1919A4 machine guns
M1919A6 machine guns
M2 HB .50 caliber machine guns

The BATF can provide a listing of the current NFA firearms classified as Curios and Relics including both U.S. and foreign weapons.

A C&R license holder must still go through the regular procedures for obtaining a NFA firearm, including filling out all forms and paying the $200 transfer tax. However, when the seller has obtained notification that the transfer has been approved, the NFA weapon can be sent to the C&R license holder even if he resides out of state. This eliminates the need to utilize the services of an in-state Class III dealer for such transactions.

It is a little known fact that Federal regulations allow for the holder of a standard Class 1 Firearms License to obtain machine guns and destructive devices through interstate commerce (the mails, etc.) without having to utilize the services of a Class III dealer. However, the Class 1 dealer must go through the same channels and procedures including the Form 4 and fingerprint cards as well as payment of the $200 tax. His license does not allow him to be a dealer for machine guns or destructive devices, but it does not prevent him from obtaining such weapons for his personal use if the standard approval and registration procedures are followed. Any questions should be referred to the appropriate sources.

The glamor and appeal of machine guns and destructive devices has resulted in a steadily appreciating collector's market for such weapons. Since it is not possible to register any additional weapons, the supply is finite and the demand continues to remain strong. This, of course, has the effect of continually rising prices.

Some may disdain machine guns, mortars, bazookas and the like as unsuitable for collecting purposes. Nothing could be further from the truth. A World War II bazooka or a M1917A1 water cooled Browning machine gun is every bit as legitimate for collecting purposes as a 1817 flintlock Common Rifle or a M1873 Trapdoor Springfield. Obviously a person isn't going to spend several thousand dollars for an original M1928A1 Thompson submachine gun to stick up the local liquor store. The mis-use of NFA registered weapons is absolutely nil.

The collecting of World War II U.S. machine guns and destructive devices is an extremely interesting and rewarding hobby, and anyone who has a desire to collect such weapons would be well advised to do so. The mechanics of transfer and registration are really not that onerous and the rewards are well worth the modest amount of effort involved.

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